FIG. 1

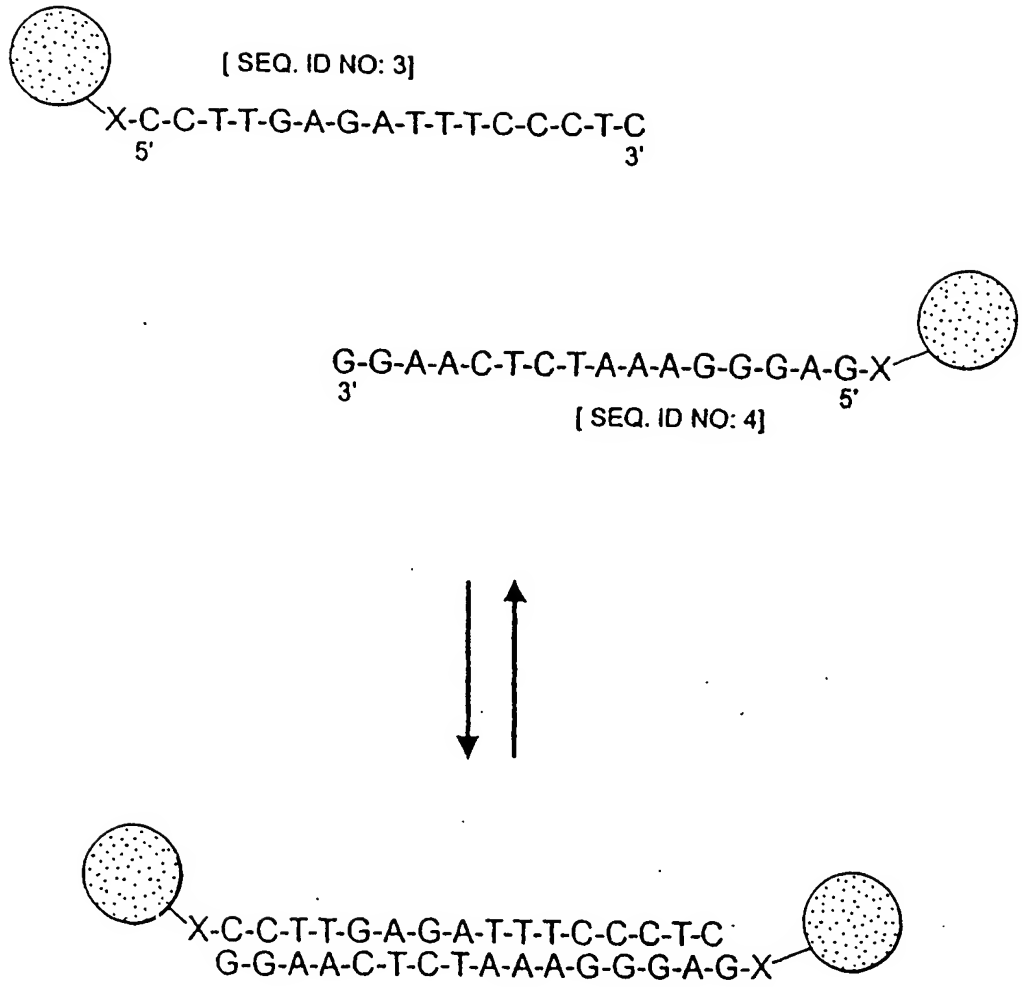


FIG. 2

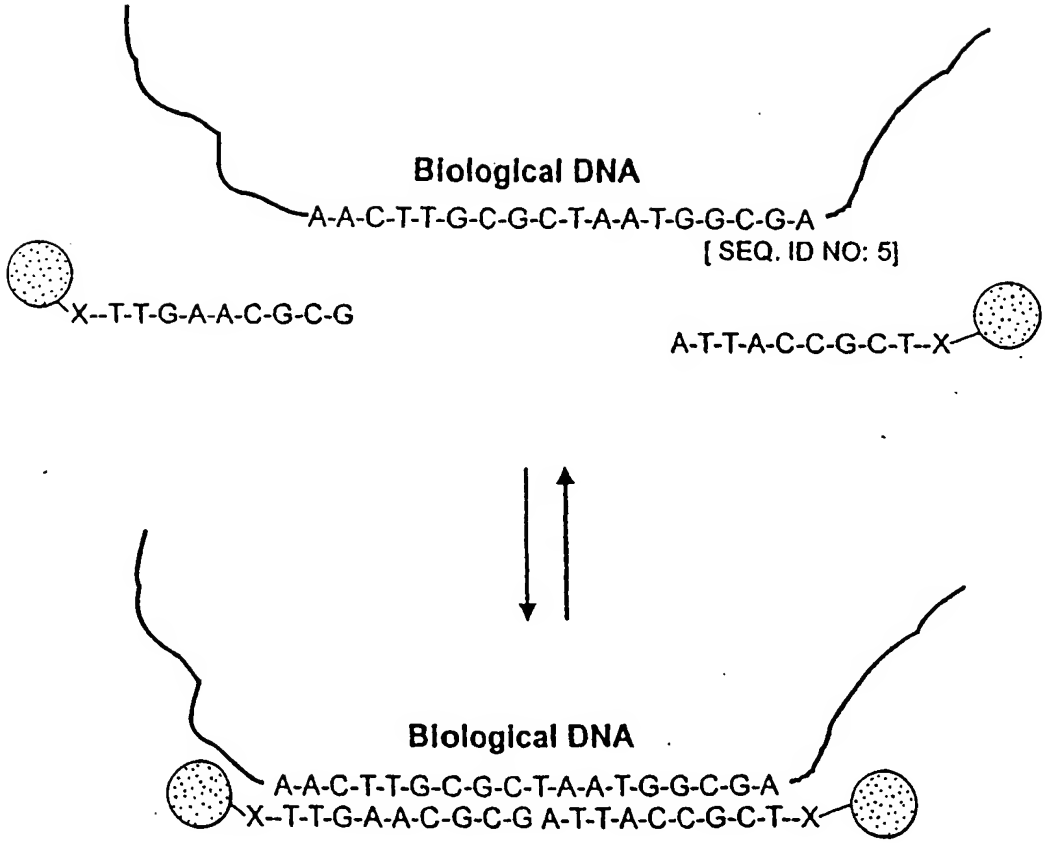

Biological DNA
A-A-C-T-T-G-C-G-C-T-A-A-T-G-G-C-G-A
[SEQ. ID NO: 5]
X--T-T-G-A-A-C-G-C-G
A-T-T-A-C-C-G-C-T--X
Biological DNA
A-A-C-T-T-G-C-G-C-T-A-A-T-G-G-C-G-A
X--T-T-G-A-A-C-G-C-G A-T-T-A-C-C-G-C-T--X

FIG. 3

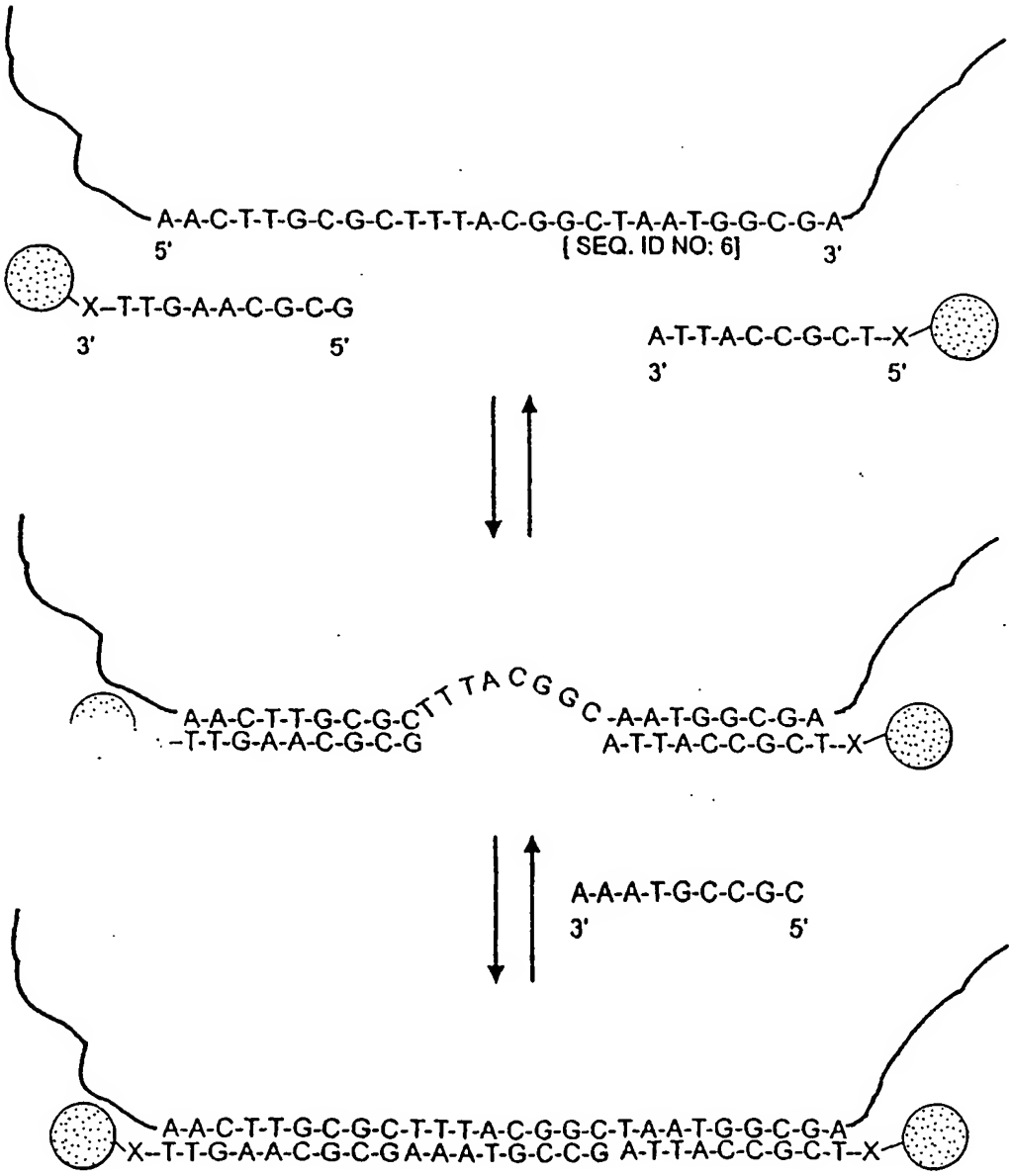

A-A-C-T-T-G-C-G-C-T-T-T-A-C-G-G-C-T-A-A-T-G-G-C-G-A
5'
[SEQ. ID NO: 6]
3'
X–T-T-G-A-A-C-G-C-G
3'
5'
A-T-T-A-C-C-G-C-T--X
3'
5'
A-A-C-T-T-G-C-G-C
T T T A C G G C
-A-A-T-G-G-C-G-A
–T-T-G-A-A-C-G-C-G
A-T-T-A-C-C-G-C-T--X
A-A-A-T-G-C-C-G-C
3'
5'
A-A-C-T-T-G-C-G-C-T-T-T-A-C-G-G-C-T-A-A-T-G-G-C-G-A
X–T-T-G-A-A-C-G-C-G-C
A-A-A-T-G-C-C-G-C
A-T-T-A-C-C-G-C-T–X

FIG. 4

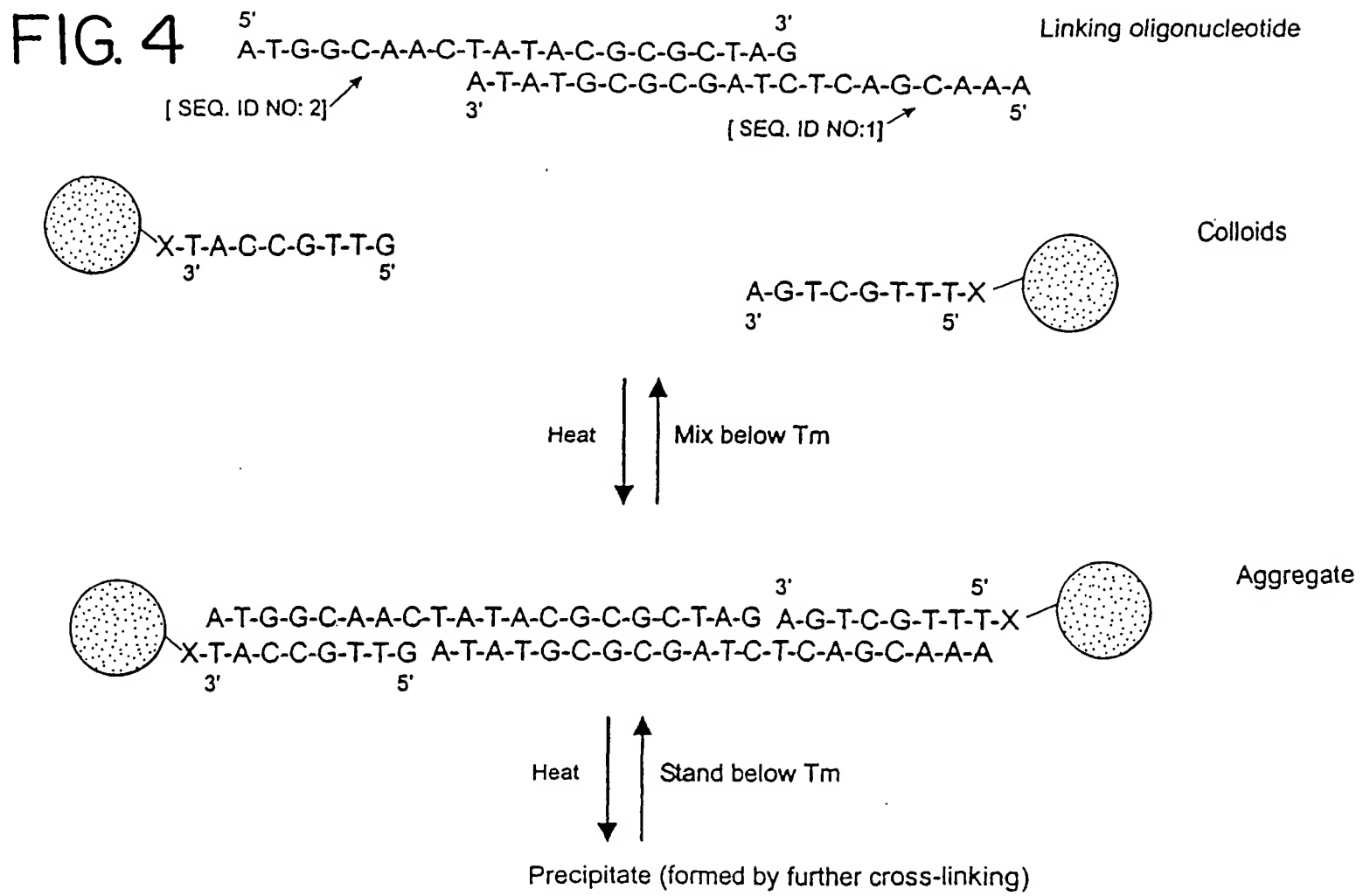

5'
A-T-G-G-C-A-A-C-T-A-T-A-C-G-C-G-C-T-A-G
3'
Linking oligonucleotide
[SEQ. ID NO: 2]
A-T-A-T-G-C-G-C-G-A-T-C-T-C-A-G-C-A-A-A
3'
5'
[SEQ. ID NO:1]
X-T-A-C-C-G-T-T-G
3'
5'
Colloids
A-G-T-C-G-T-T-T-X
3'
5'
Heat
Mix below Tm
3'
5'
A-T-G-G-C-A-A-C-T-A-T-A-C-G-C-G-C-T-A-G A-G-T-C-G-T-T-T-X
X-T-A-C-C-G-T-T-G A-T-A-T-G-C-G-C-G-A-T-C-T-C-A-G-C-A-A-A
3'
5'
Aggregate
Heat
Stand below Tm
Precipitate (formed by further cross-linking)

FIG. 5

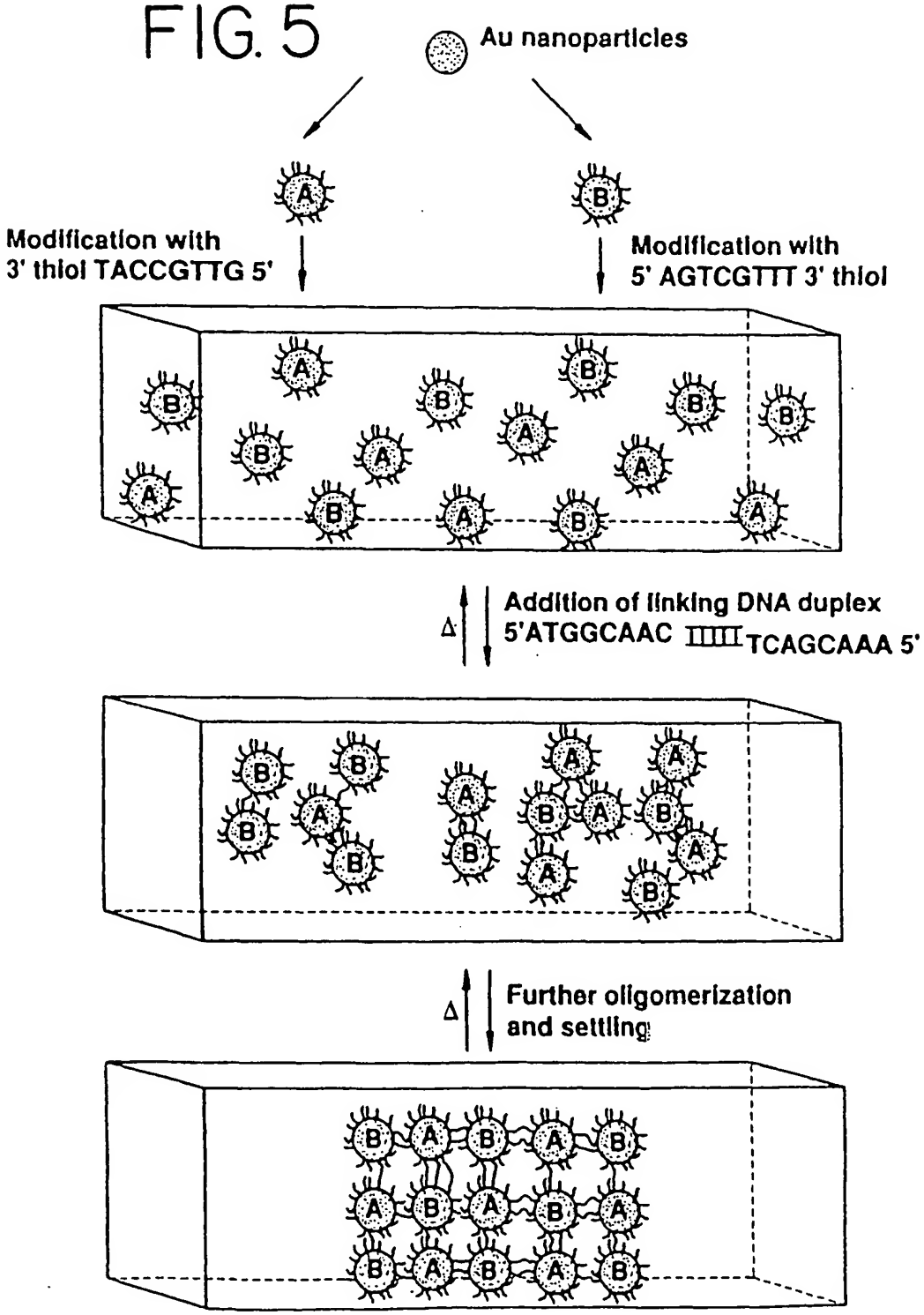

Au nanoparticles
A
B
Modification with
3' thiol TACCGTTG 5'
Modification with
5' AGTCGTTT 3' thiol
Δ
Addition of linking DNA duplex
5'ATGGCAAC IIIII TCAGCAAA 5'
Δ
Further oligomerization
and settling

FIG. 6A FIG. 6B FIG. 6C

FIG. 7

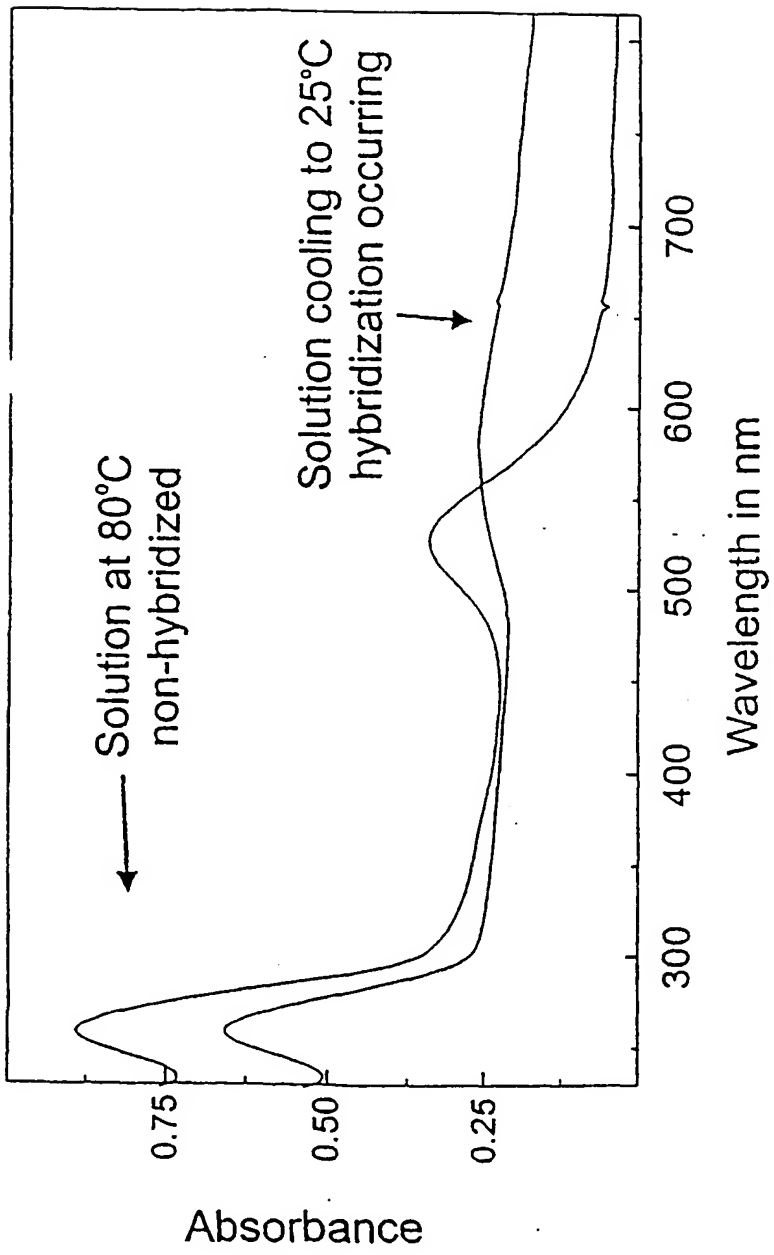

Solution at 80°C
non-hybridized
Solution cooling to 25°C
hybridization occurring
0.75
0.50
0.25
Absorbance
300
400
500
600
700
Wavelength in nm

FIG. 8B

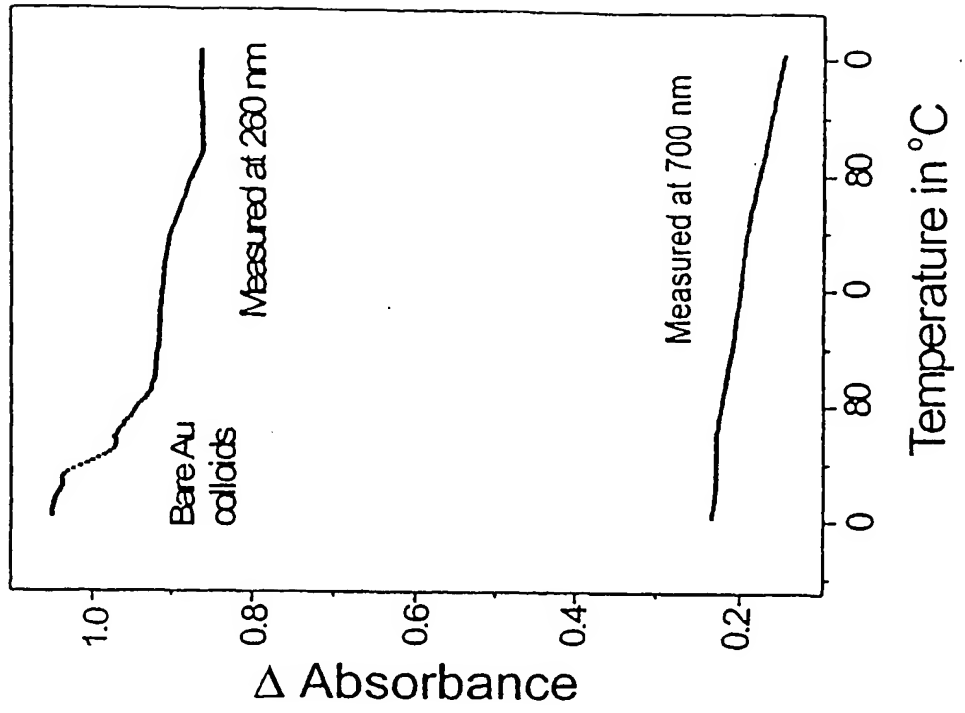

Bare Au colloids
Measured at 260 nm
Measured at 700 nm
1.0
0.8
0.6
0.4
0.2
Δ Absorbance
0 80 0 80 0 80 0 80 0
Temperature in °C

FIG. 8A

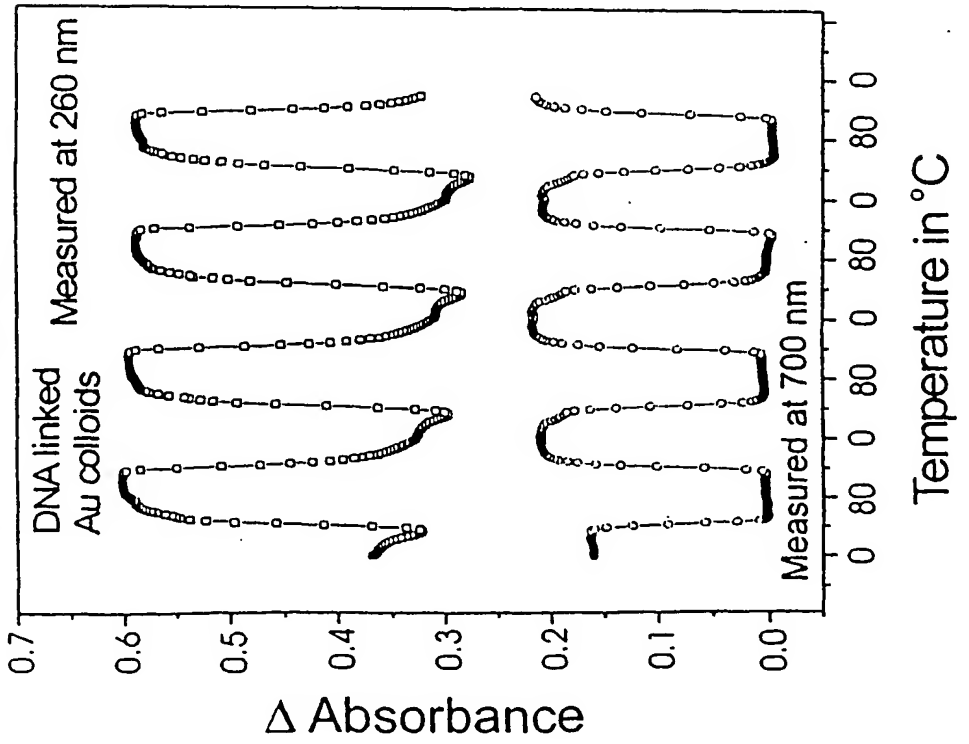

DNA linked Au colloids
Measured at 260 nm
Measured at 700 nm
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Δ Absorbance
0 80 0 80 0 80 0 80 0
Temperature in °C

FIG. 9A

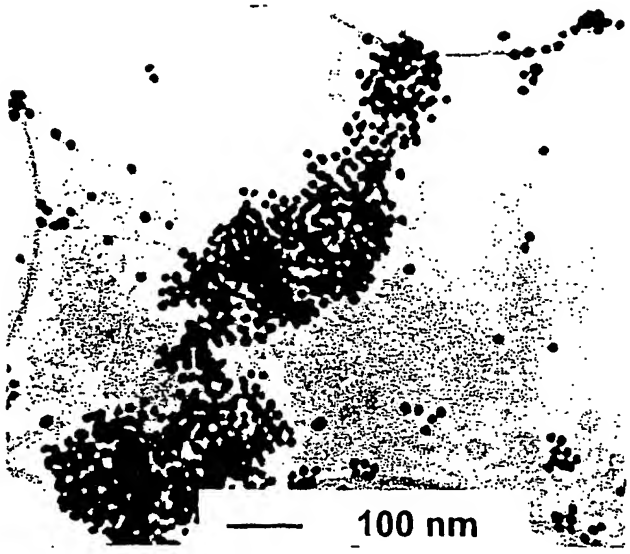


FIG. 9B

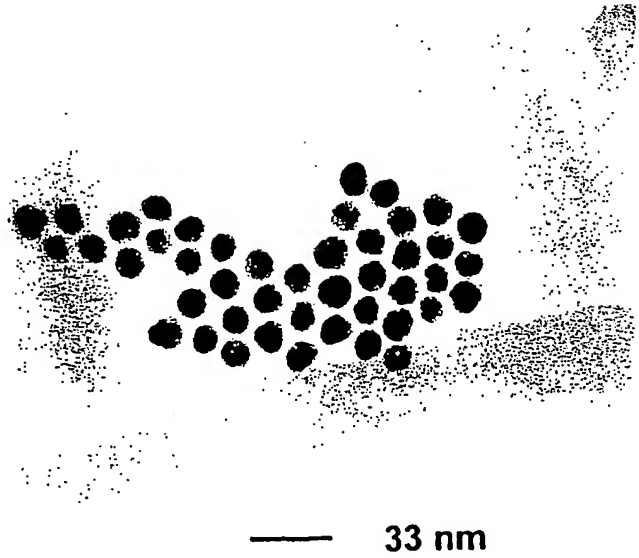


FIG. 10

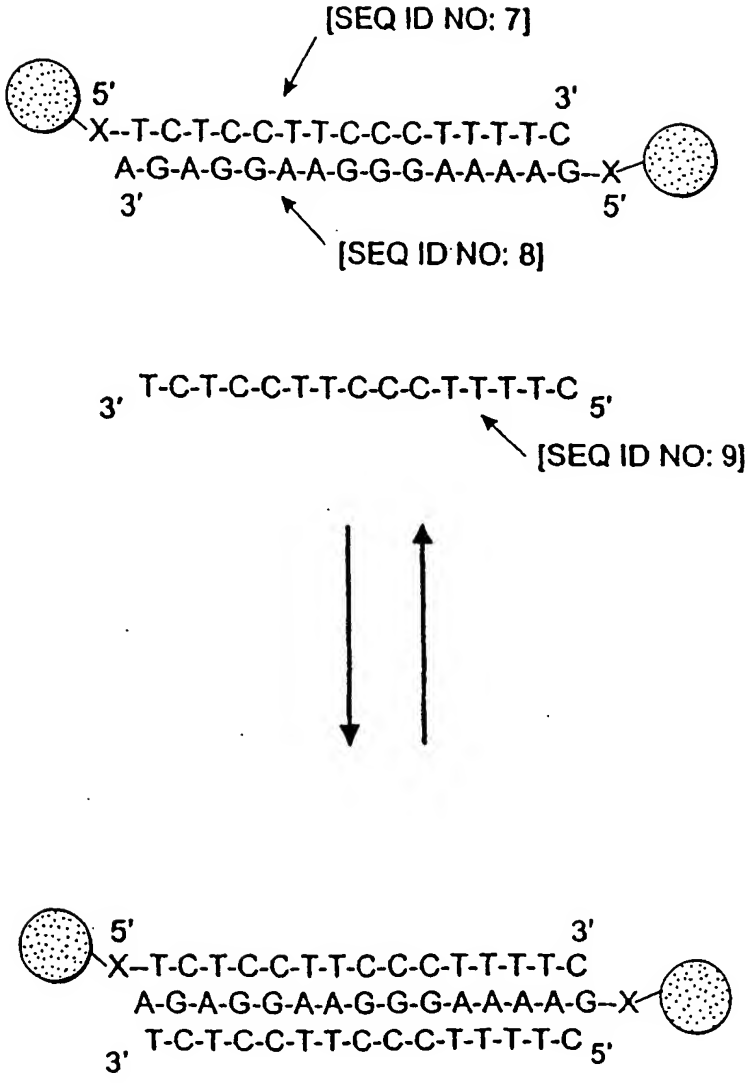

[SEQ ID NO: 7]
5'
3'
X--T-C-T-C-C-T-T-C-C-C-T-T-T-T-C
A-G-A-G-G-A-A-G-G-G-A-A-A-A-G--X
3'
5'
[SEQ ID NO: 8]
3'
T-C-T-C-C-T-T-C-C-C-T-T-T-T-C
5'
[SEQ ID NO: 9]
5'
3'
X--T-C-T-C-C-T-T-C-C-C-T-T-T-T-C
A-G-A-G-G-A-A-G-G-G-A-A-A-A-G--X
3'
T-C-T-C-C-T-T-C-C-C-T-T-T-T-C
5'

FIG. 11

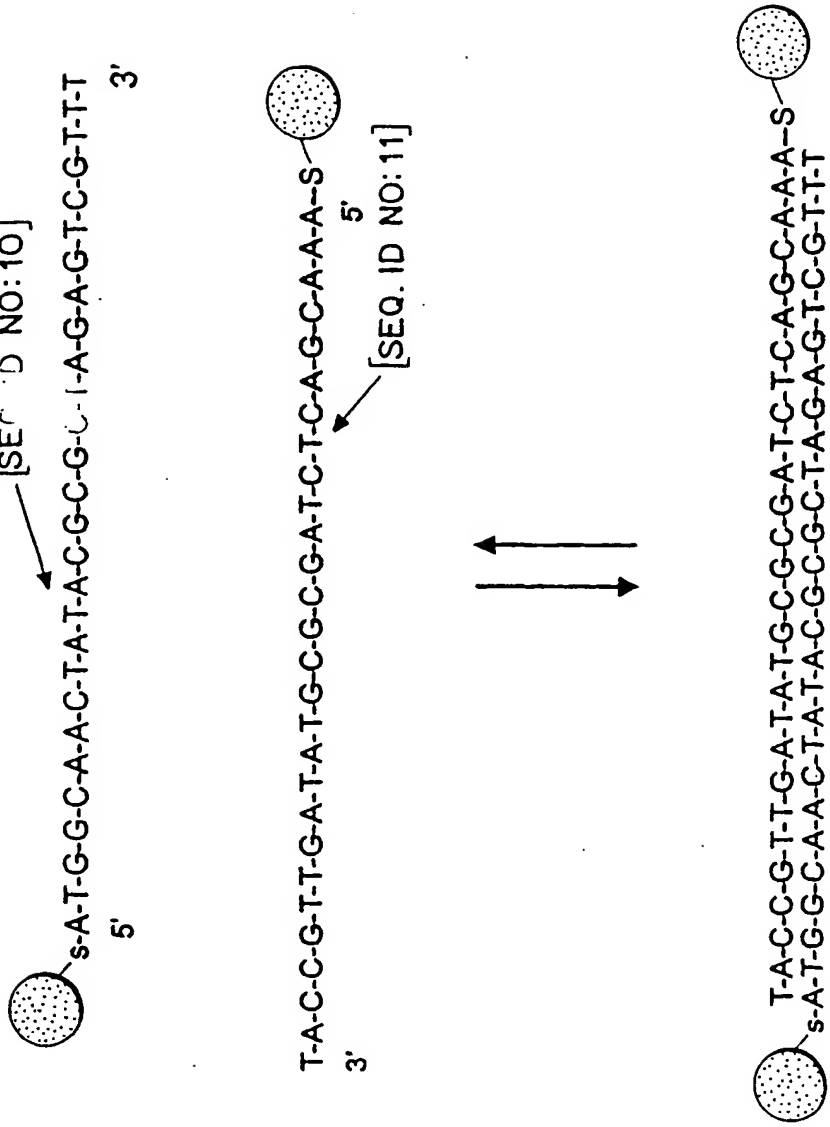

[SEQ. ID NO:10]
s-A-T-G-G-C-A-A-C-T-A-T-A-C-G-C-G-C-A-G-A-G-T-C-G-T-T-T
5'
3'
T-A-C-C-G-T-T-G-A-T-A-T-G-C-G-C-G-A-T-C-T-C-A-G-C-A-A-A-S
5'
3'
[SEQ. ID NO:11]
T-A-C-C-G-T-T-G-A-T-A-T-G-C-G-C-G-A-T-C-T-C-A-G-C-A-A-A-S
s-A-T-G-G-C-A-A-C-T-A-T-A-C-G-C-G-C-T-A-G-A-G-T-C-G-T-T-T

FIG. 12A

Complementary Target

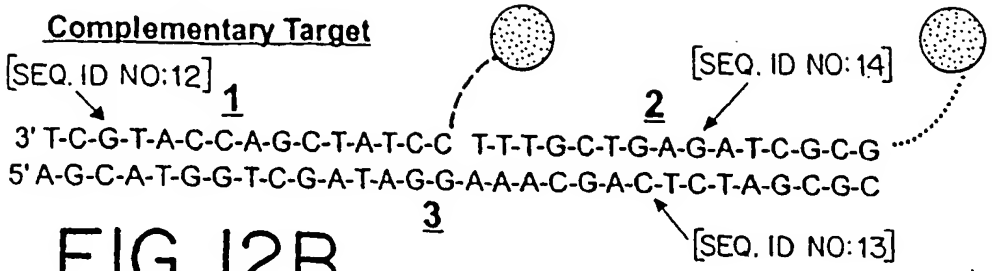


FIG. 12B

Probes without Target

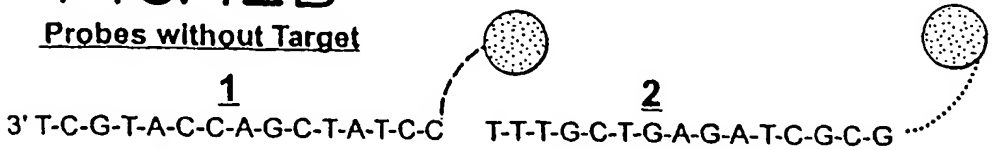


FIG. 12C

Half Complementary Target

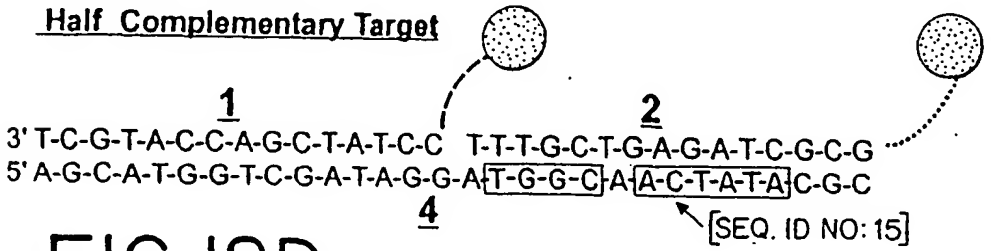


FIG. 12D

Target - 6 bp

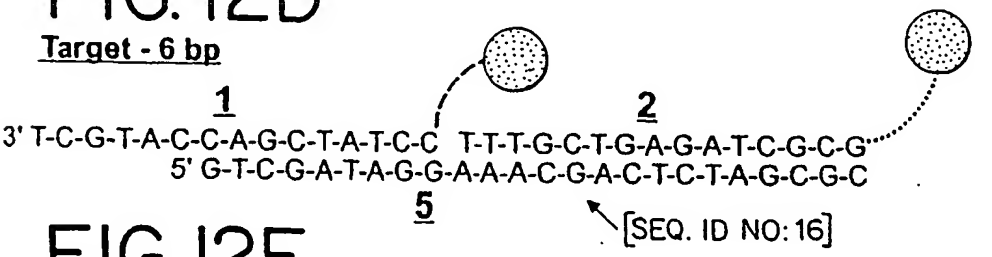


FIG. 12E

One bp Mismatch

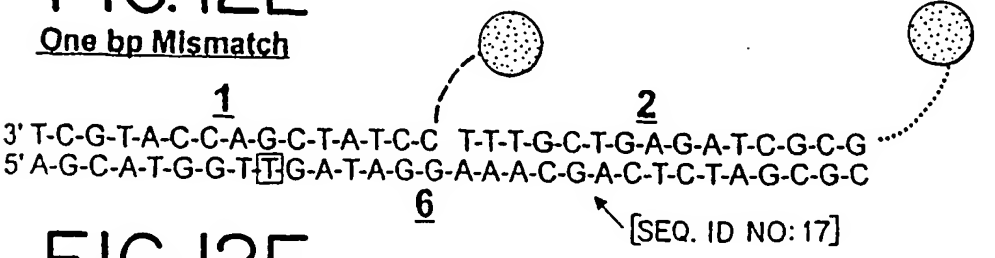


FIG. 12F

Two bp Mismatch

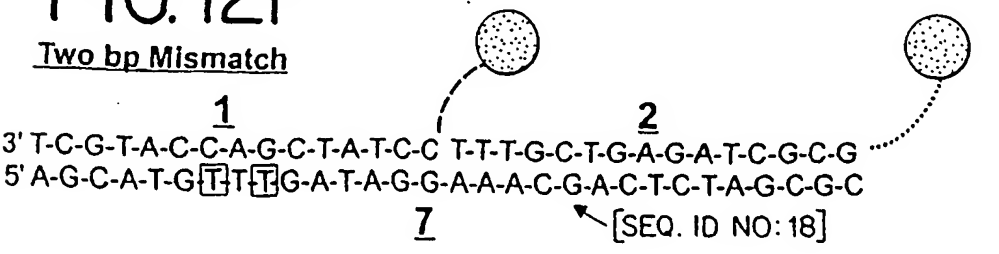


FIG. 13A

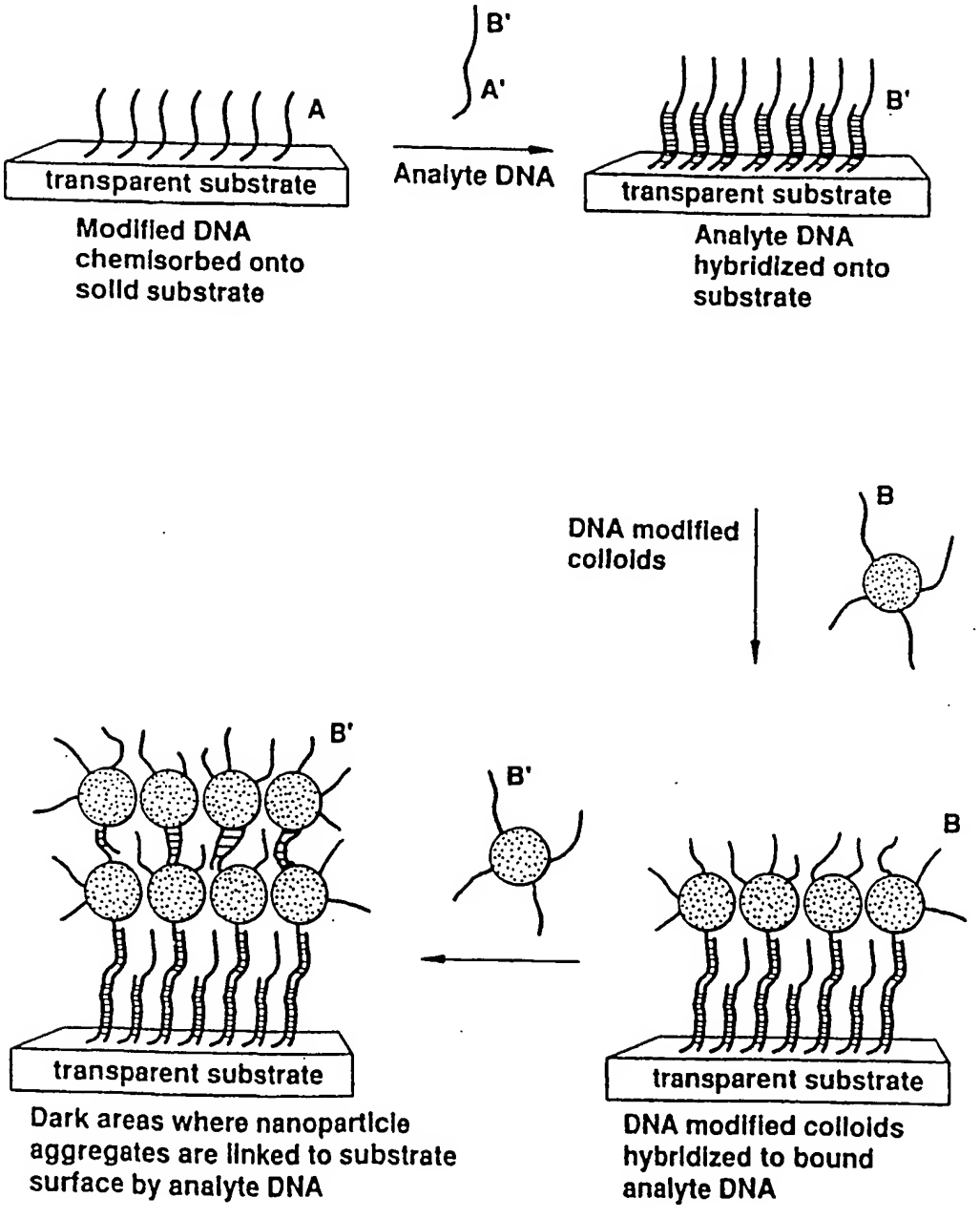

B'
A'
A
transparent substrate
Analyte DNA
B'
transparent substrate
Modified DNA chemisorbed onto solid substrate
Analyte DNA hybridized onto substrate
DNA modified colloids
B
B'
B'
B
transparent substrate
transparent substrate
Dark areas where nanoparticle aggregates are linked to substrate surface by analyte DNA
DNA modified colloids hybridized to bound analyte DNA

FIG. 13B

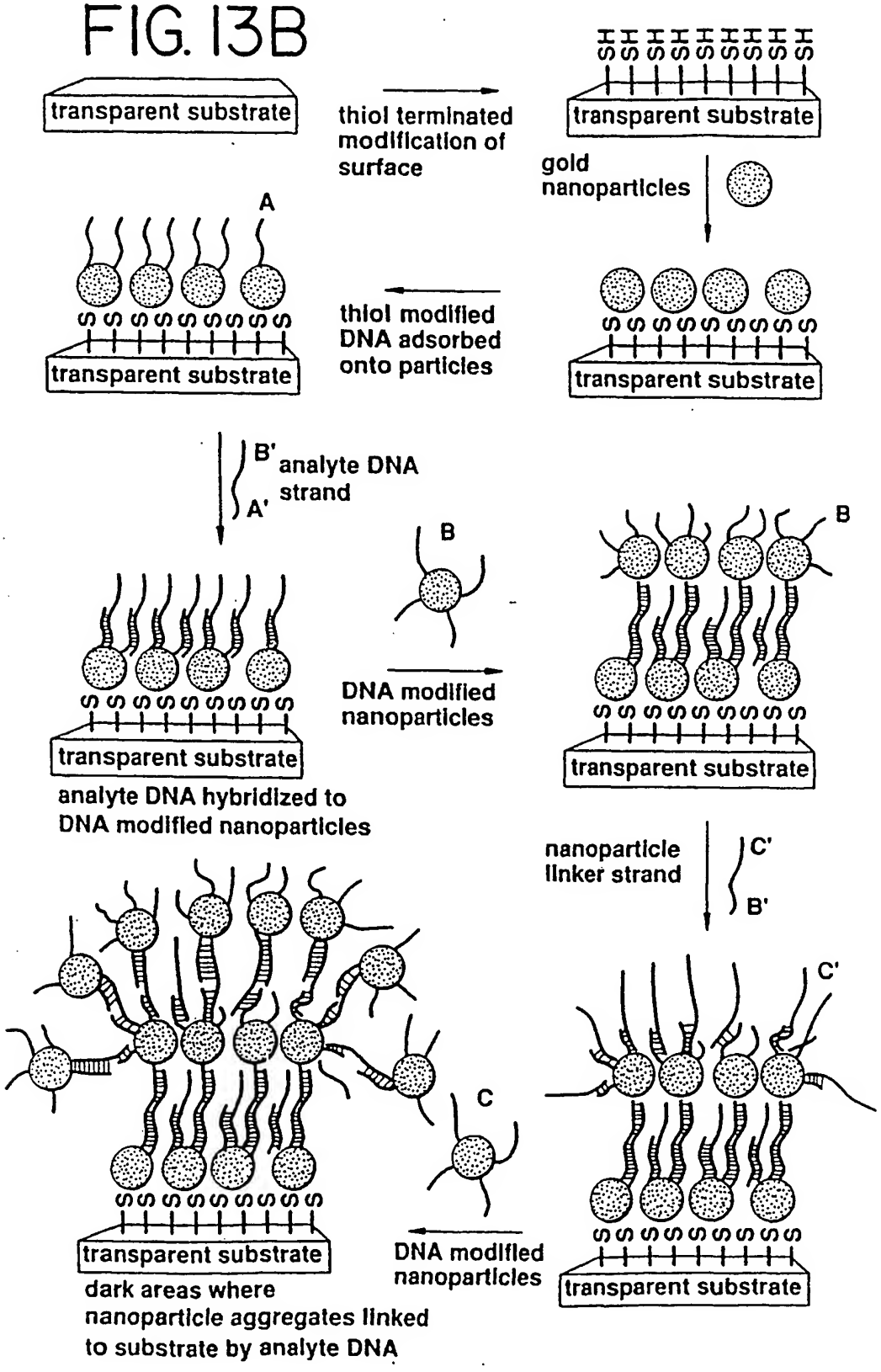

transparent substrate
thiol terminated modification of surface
transparent substrate
gold nanoparticles
A
thiol modified DNA adsorbed onto particles
transparent substrate
transparent substrate
B' analyte DNA strand
A'
B
DNA modified nanoparticles
transparent substrate
analyte DNA hybridized to DNA modified nanoparticles
B
transparent substrate
nanoparticle linker strand
C'
B'
C'
C
transparent substrate
DNA modified nanoparticles
transparent substrate
dark areas where nanoparticle aggregates linked to substrate by analyte DNA

FIG. 14A

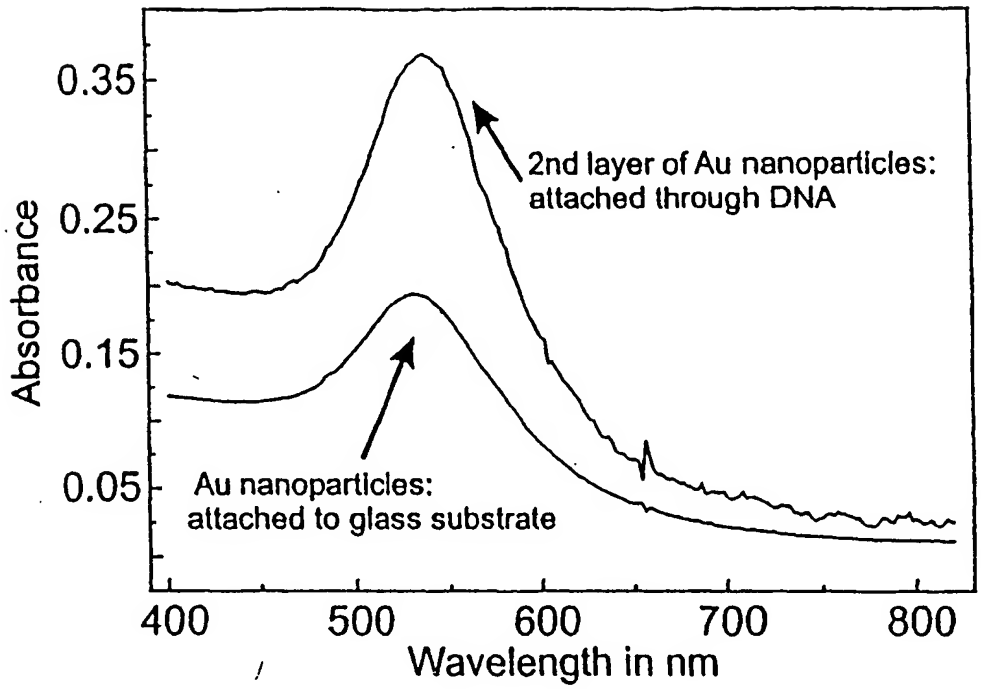


FIG. 14B

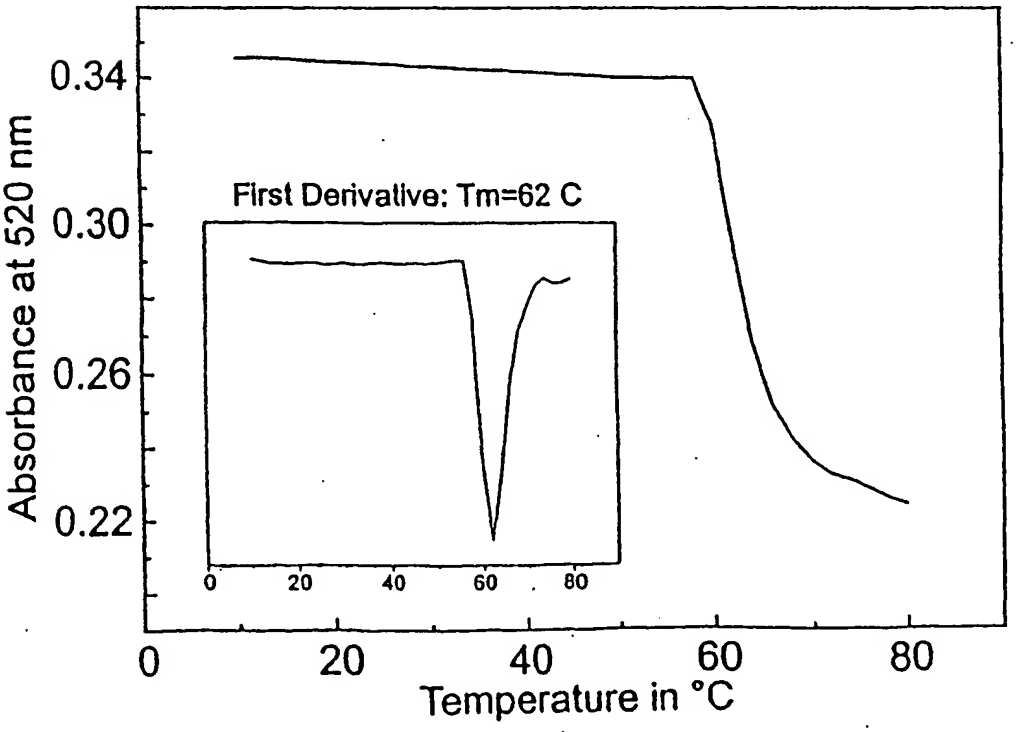


FIG. 15A

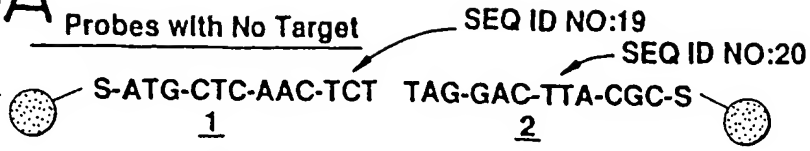


FIG. 15B

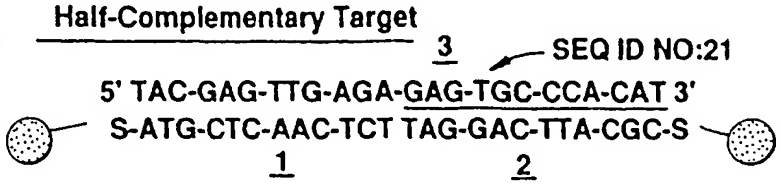


FIG. 15C

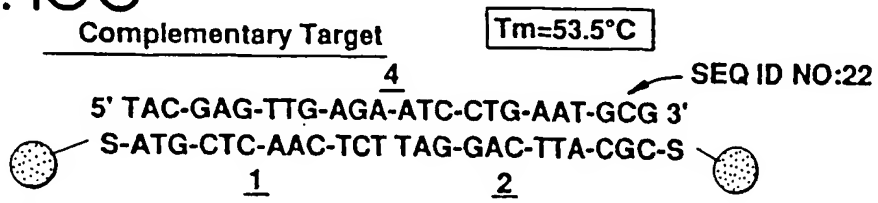


FIG. 15D

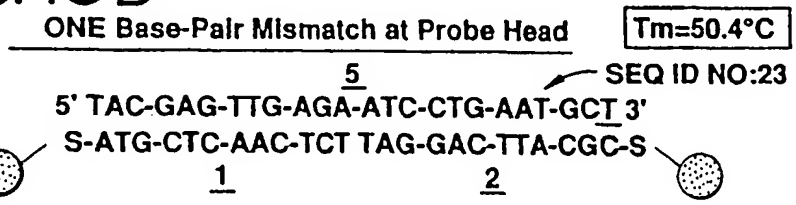


FIG. 15E

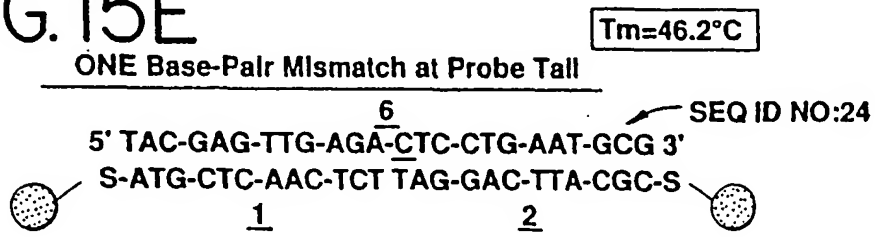


FIG. 15F

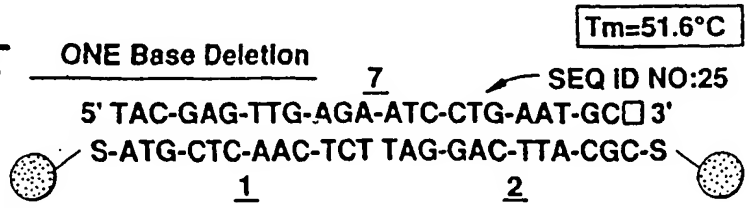


FIG. 15G

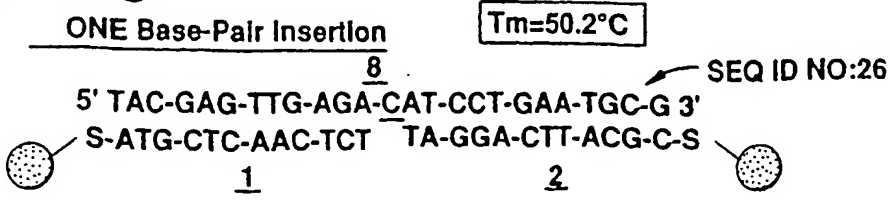


FIG. 16A

24 Base Template

5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GCG 3'
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S
1 2

FIG. 16B

48 Base Template with Complementary 24 Base Filler

5' TAC-GAG-TTG-AGA-CCG-TTA-AGA-CGA-GGC-AAT-CAT-GCA-ATC-CTG-AAT-GCG 3'
S-ATG-CTC-AAC-TCT GGC-AAT-TCT-GCT-CCG-TTA-GTA-CGT TAG-GAC-TTA-CGC-S
1 2

FIG. 16C

72 Base Template with Complementary 48 Base Filler

5' TAC-GAG-TTG-AGA-CCG-TTA-AGA-CGA-GGC-AAT-CAT-GCA-TAT-ATT-GGA-CGC-TTT-ACG-GAC-AAC-ATC-CTG-AAT-GCG 3'
S-ATG-CTC-AAC-TCT GGC-AAT-TCT-GCT-CCG-TTA-GTA-CGT-ATA-TAA-CCT-GCG-AAA-TGC-CTG-TTG TAG-GAC-TTA-CGC-S
1 2

FIG. 17A

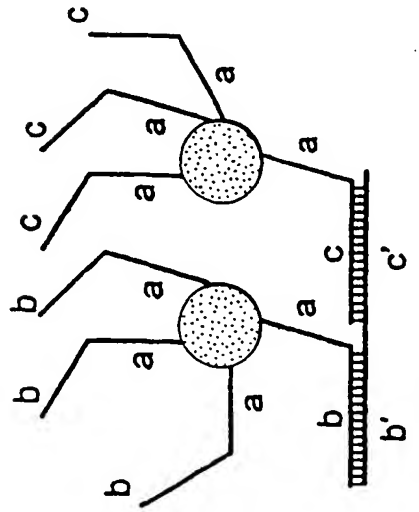


FIG. 17B

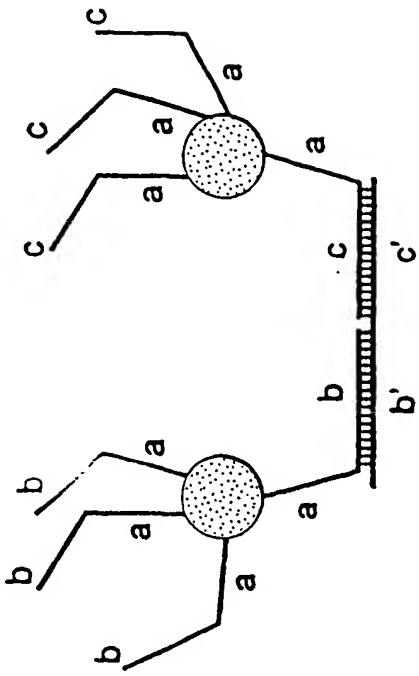
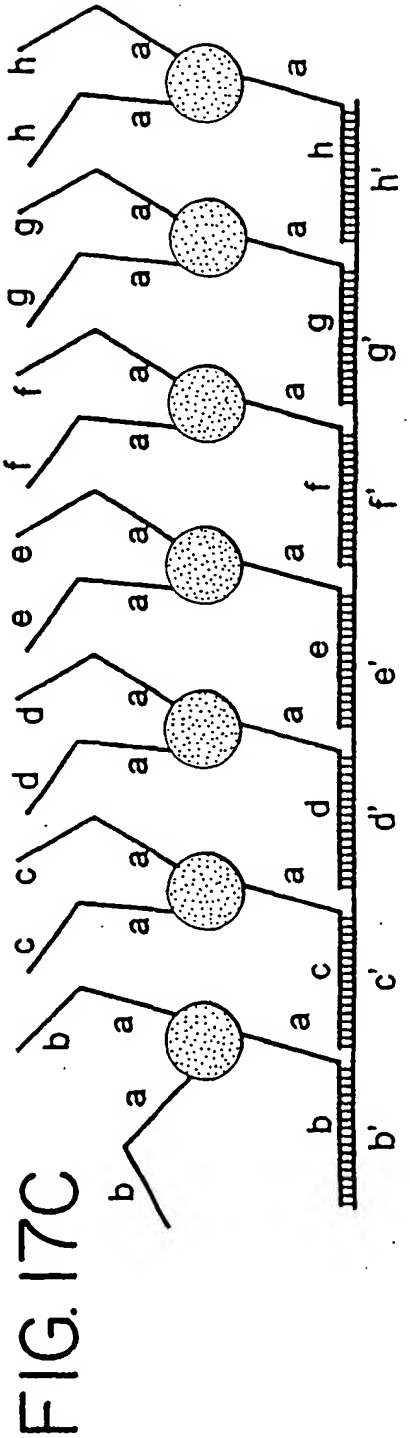


FIG. 17C



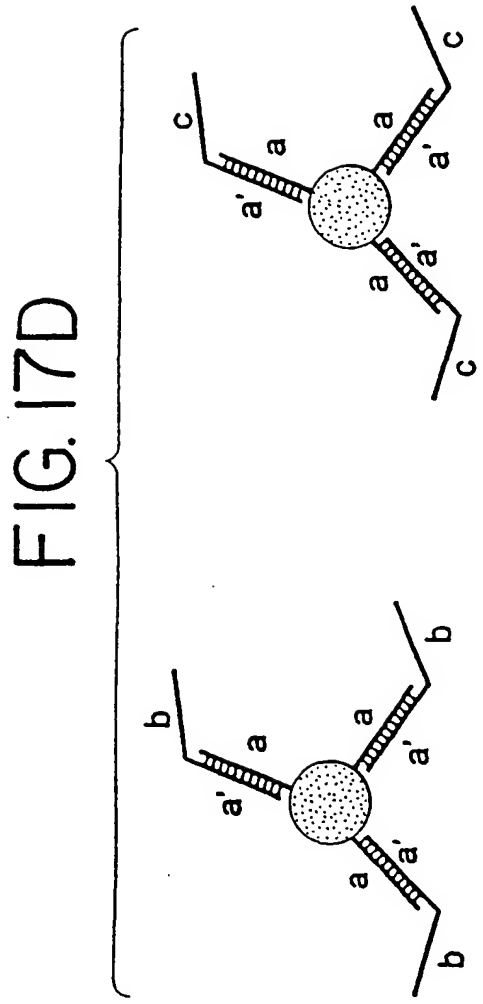


FIG. 17D

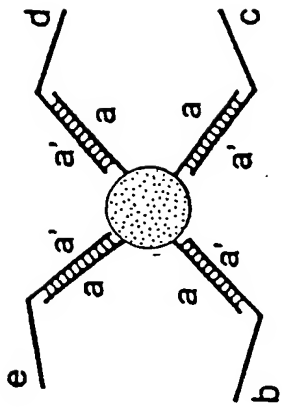


FIG. 17E

FIG. 18

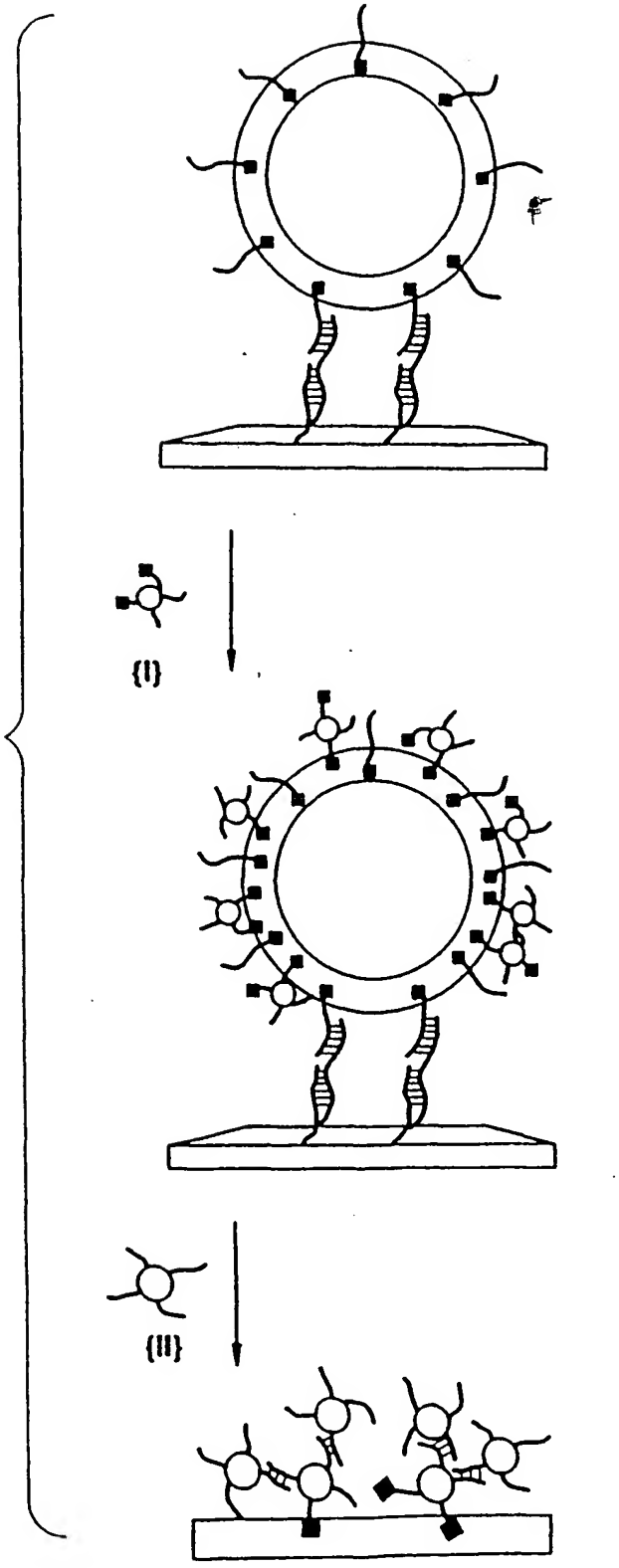


FIG. 19A

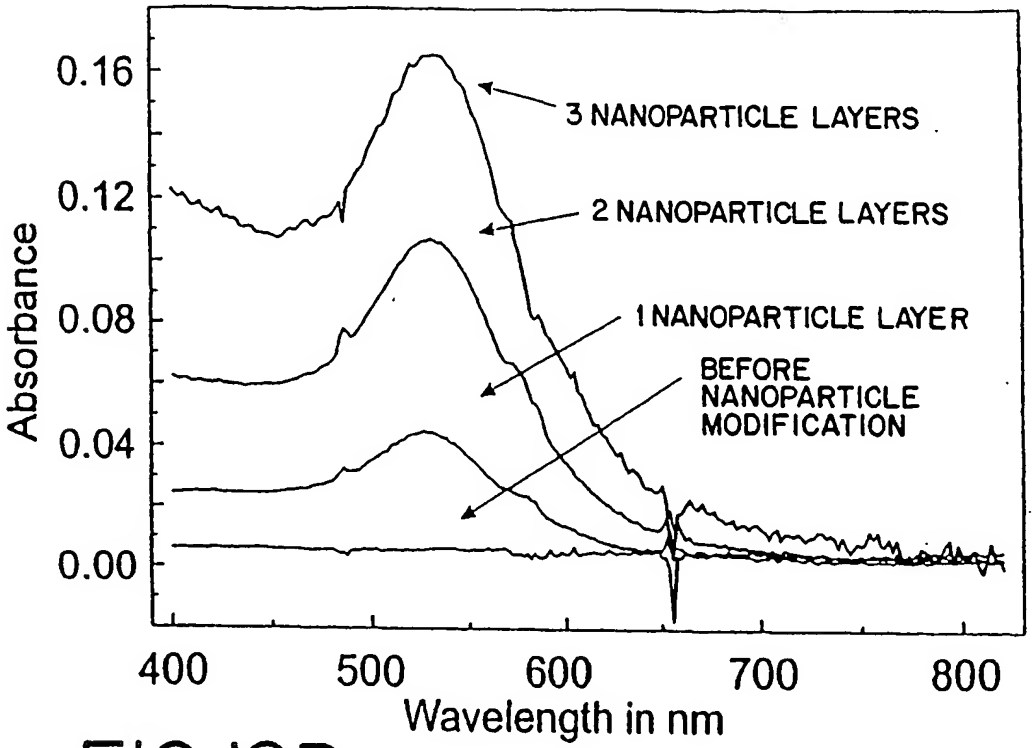


FIG. 19B

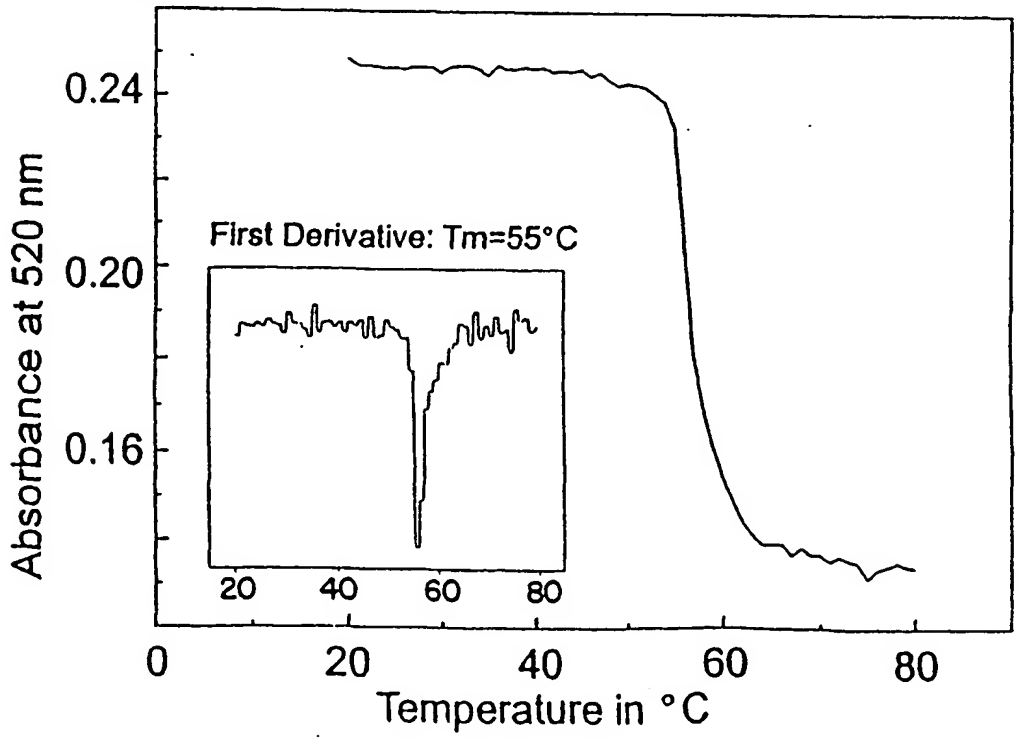


FIG. 20A

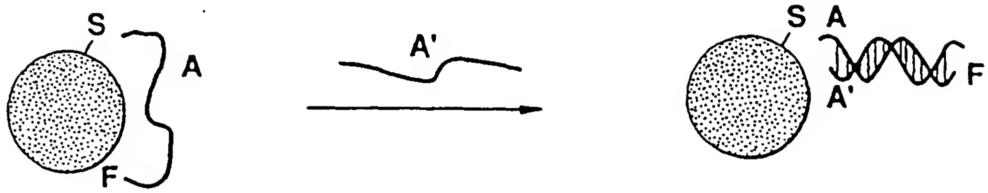


FIG. 20B

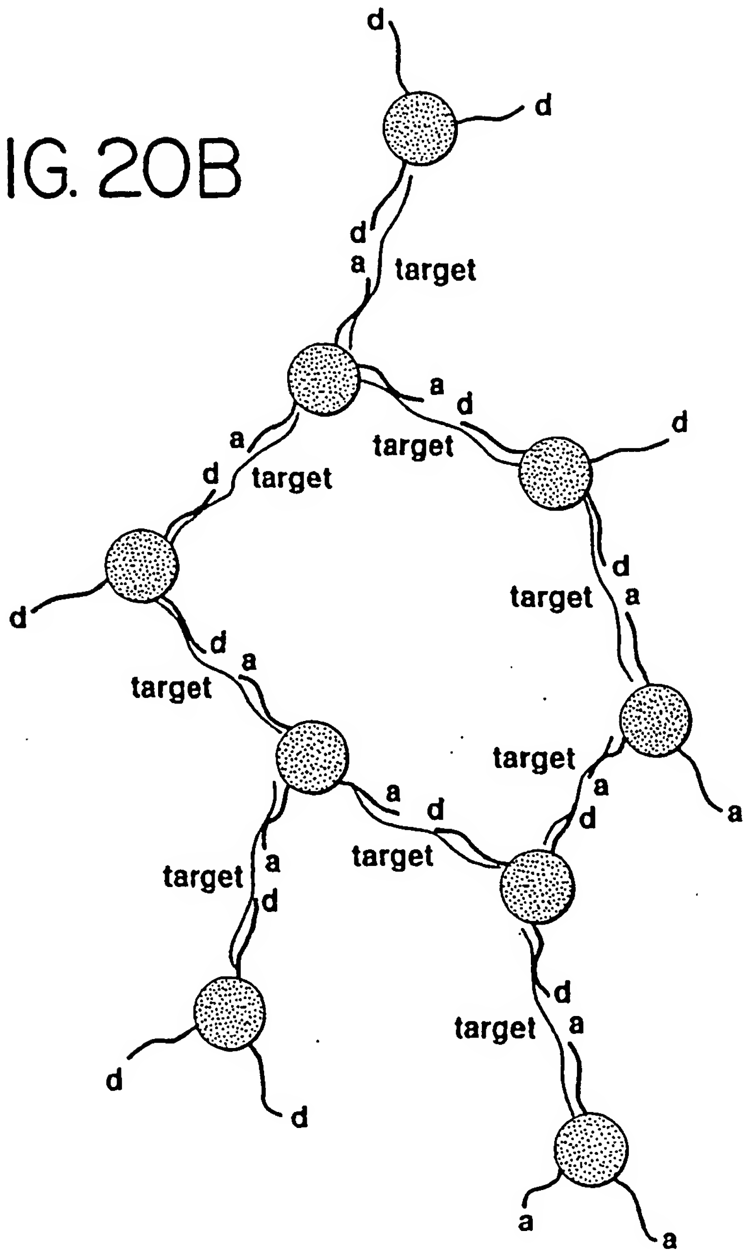


FIG. 21

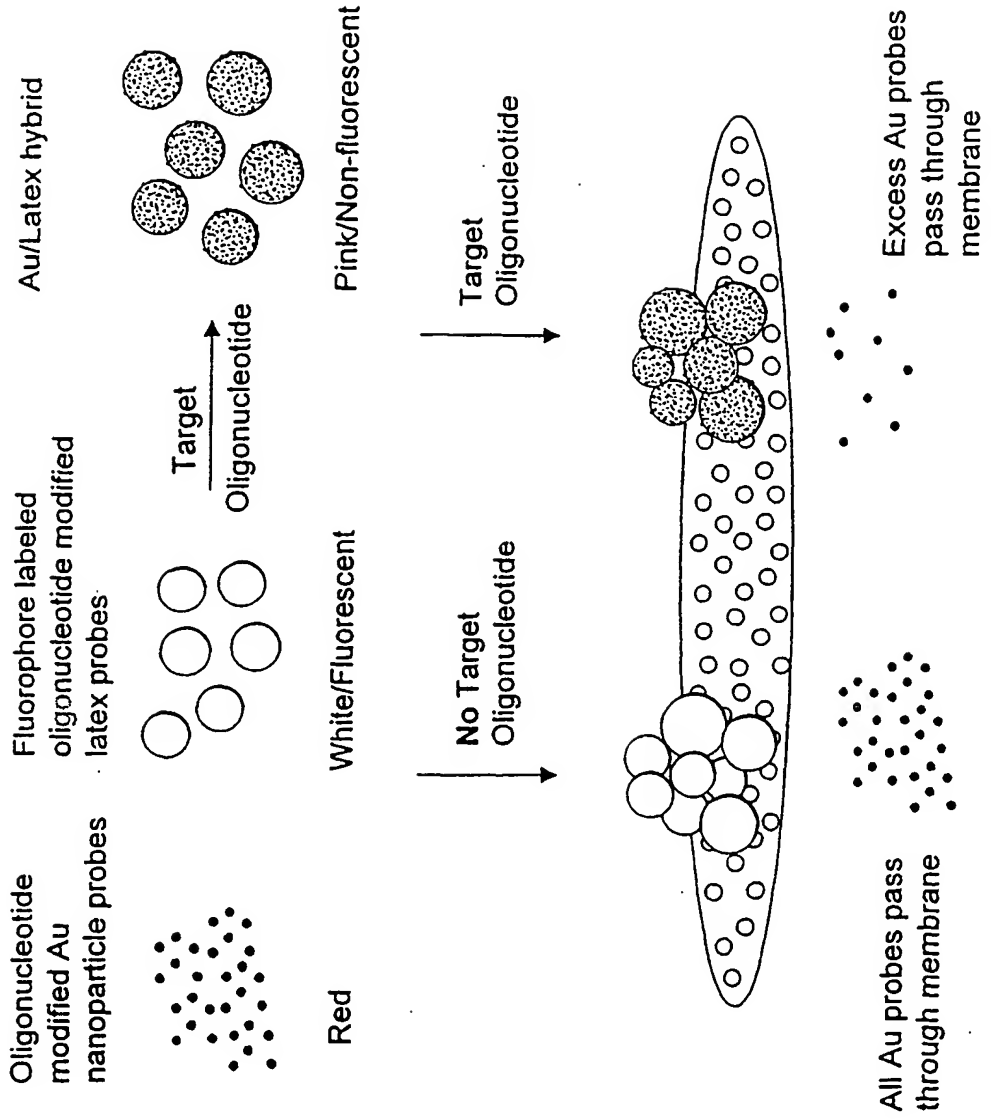

Oligonucleotide modified Au nanoparticle probes
Red
Fluorophore labeled oligonucleotide modified latex probes
White/Fluorescent
Target Oligonucleotide
Au/Latex hybrid
Pink/Non-fluorescent
No Target Oligonucleotide
Target Oligonucleotide
All Au probes pass through membrane
Excess Au probes pass through membrane

FIG. 22

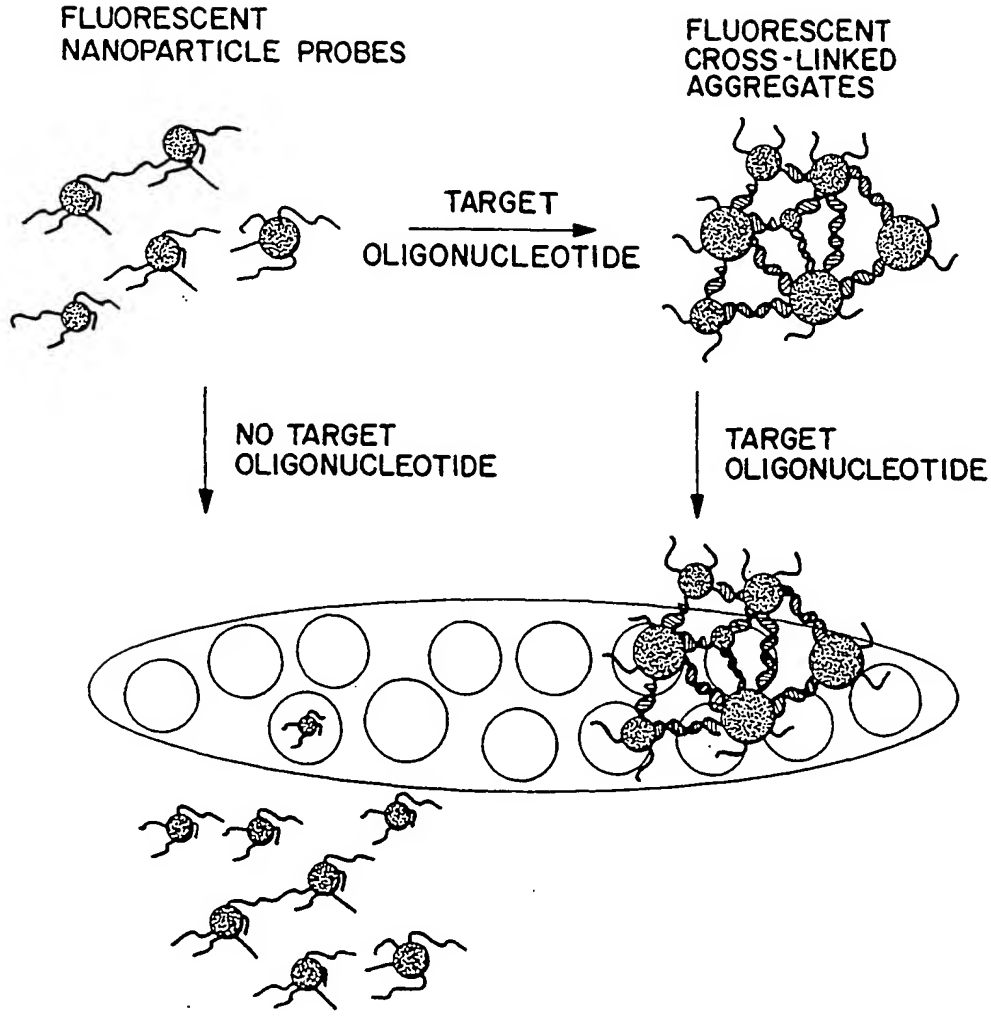

FLUORESCENT
NANOPARTICLE PROBES
FLUORESCENT
CROSS-LINKED
AGGREGATES
TARGET
OLIGONUCLEOTIDE
NO TARGET
OLIGONUCLEOTIDE
TARGET
OLIGONUCLEOTIDE
THE FLUORESCENT NANOPARTICLE PROBES PASS THROUGH THE MEMBRANE
THE FLUORESCENT CROSS-LINKED AGGREGATES ARE RETAINED BY THE MEMBRANE

FIG. 23

Anthrax PCR Product

5'G GCG GAT GAG TCA GTA GTT AAG GAG GCT CAT AGA GAA GTA ATT AAT
3'C CGC CTA CTC AGT CAT CAA TTC CTC CGA GTA TCT CTT CAT TAA TTA

TCG TCA ACA GAG GGA TTA TTG TTA AAT ATT GAT AAG GAT ATA AGA AAA
AGC AGT TGT CTC CCT AAT AAC AAT TTA TAA CTA TTC CTA TAT TCT TTT

ATA TTA TCC AGG GTT ATA TTG TAG AAA TTG AAG ATA CTG AAG GGC TT 3'
TAT AAT AGG TCC CAA TAT AAC ATC TTT AAC TTC TAT GAC TTC CCG AA 5'

141 mer Anthrax PCR product [SEQ ID NO:36]

3' CTC CCT AAT AAC AAT

[SEQ ID NO:37]

3' TTA TAA CTA TTC CTA

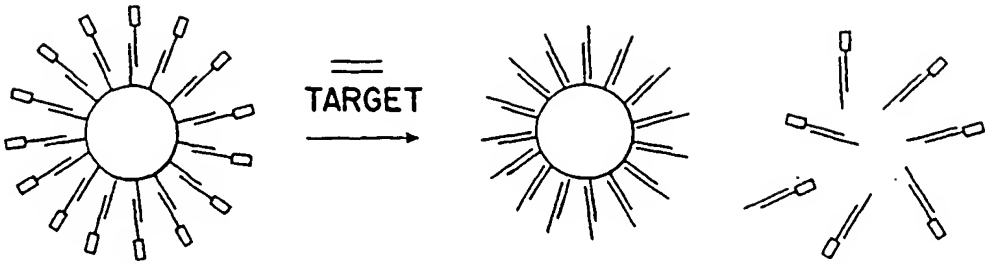
[SEQ ID NO:38]

Oligonucleotide-Nanoparticle Probes

Blocker Oligonucleotides

3' C CGC CTA CTC AGT CAT CAA TTC CTC CGA GT	[SEQ ID NO:39]
3' A TCT CTT CAT TAA TTA AGC AGT TGT	[SEQ ID NO:40]
3' TAT TCT TTT TAT AAT AGG TCC CAA TAT	[SEQ ID NO:41]
3' AAC ATC TTT AAC TTC TAT GAC TTC CCG AA	[SEQ ID NO:42]

FIG. 24


TARGET
SATELLITE PROBE
DETECTION SIGNAL

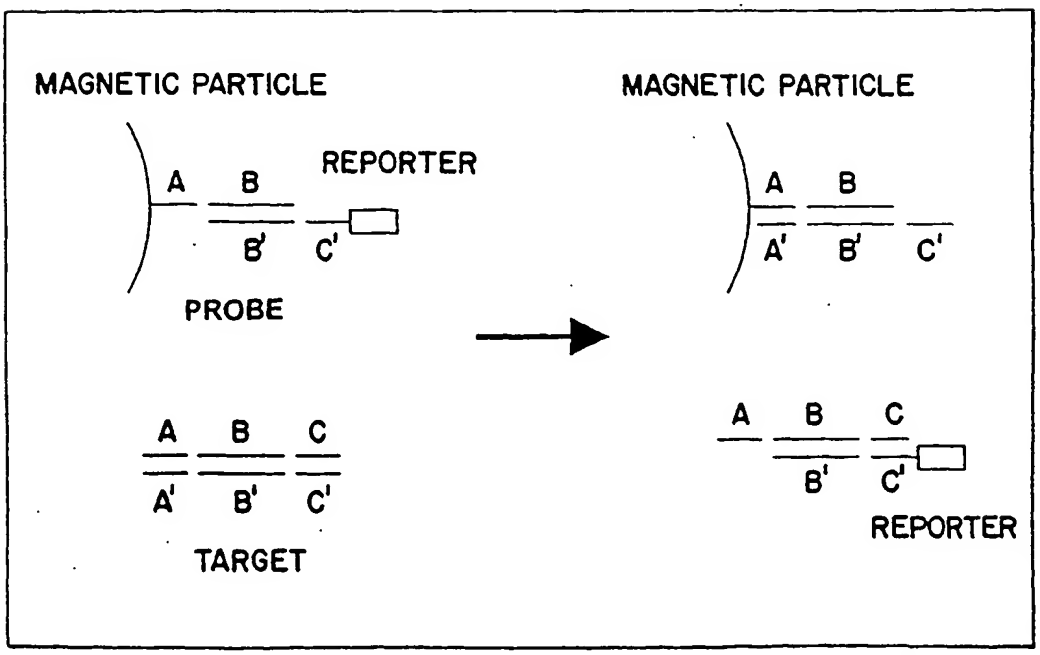

MAGNETIC PARTICLE
A
B
REPORTER
B'
C'
PROBE
A
B
C
A'
B'
C'
TARGET
MAGNETIC PARTICLE
A
B
A'
B'
C'
A
B
C
B'
C'
REPORTER

FIG. 25A

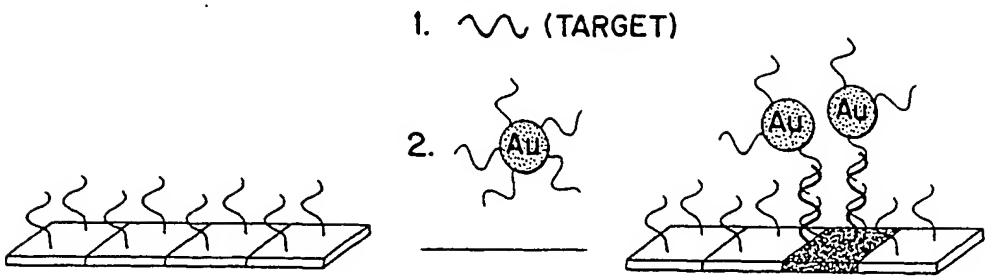


FIG. 25B

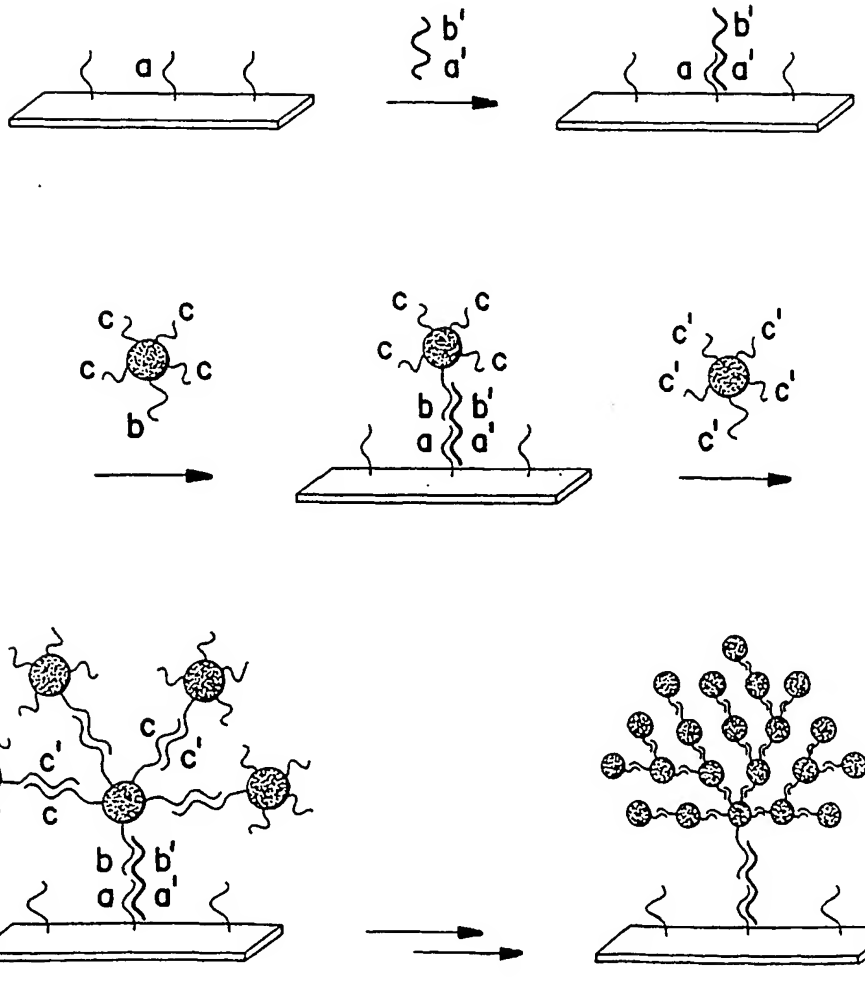


FIG. 26A

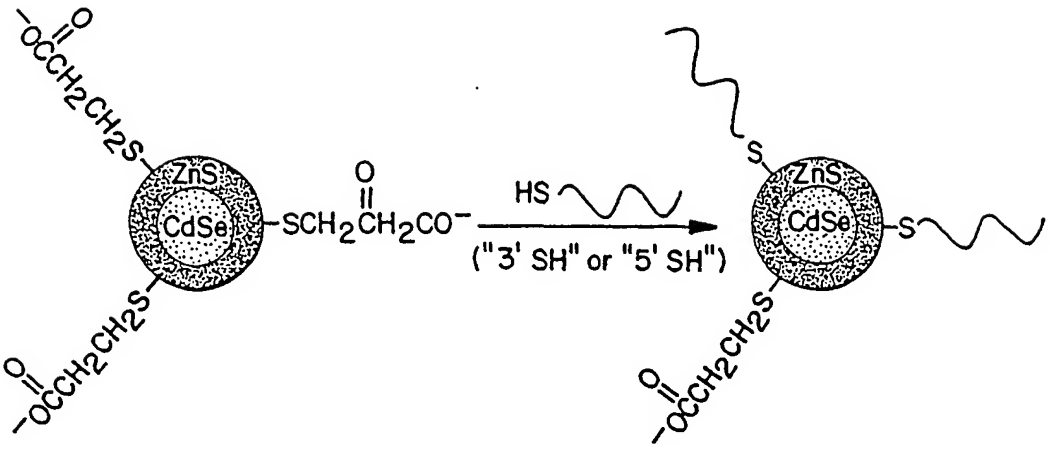


FIG. 26B

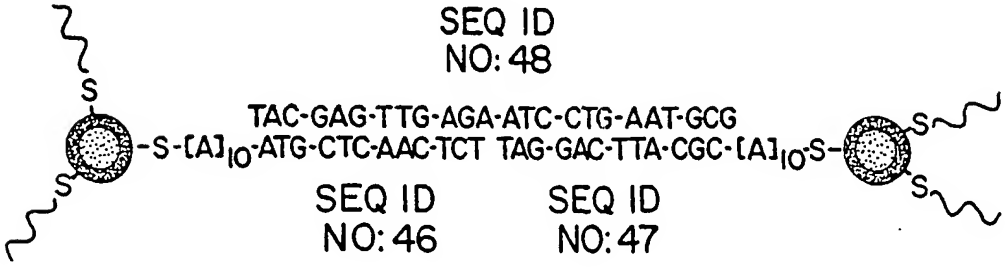


FIG. 27A

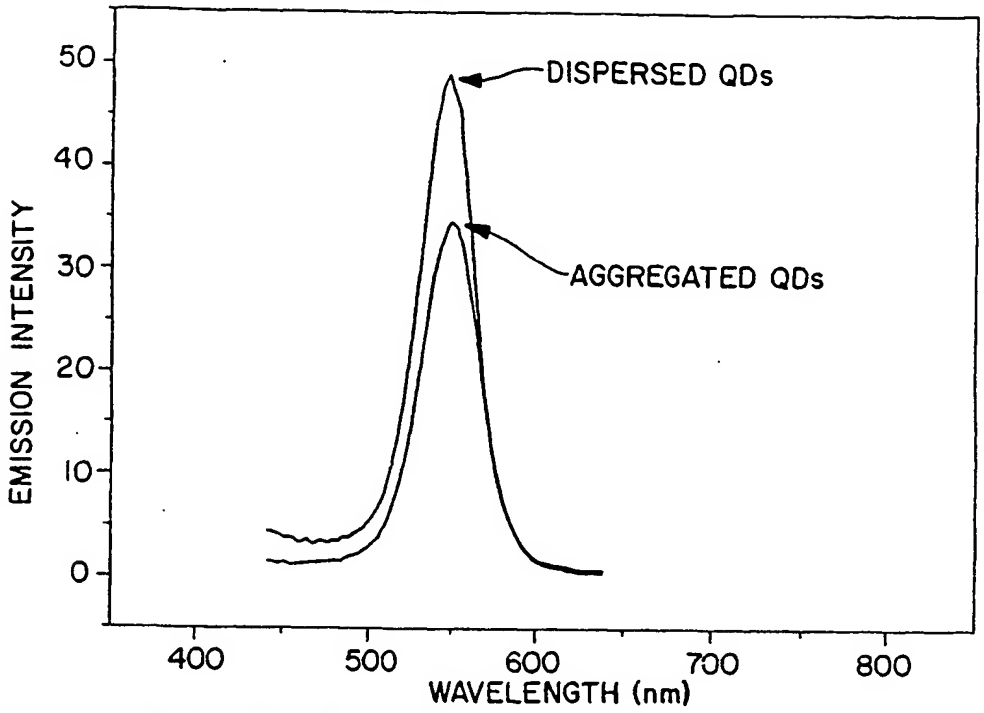


FIG. 27B

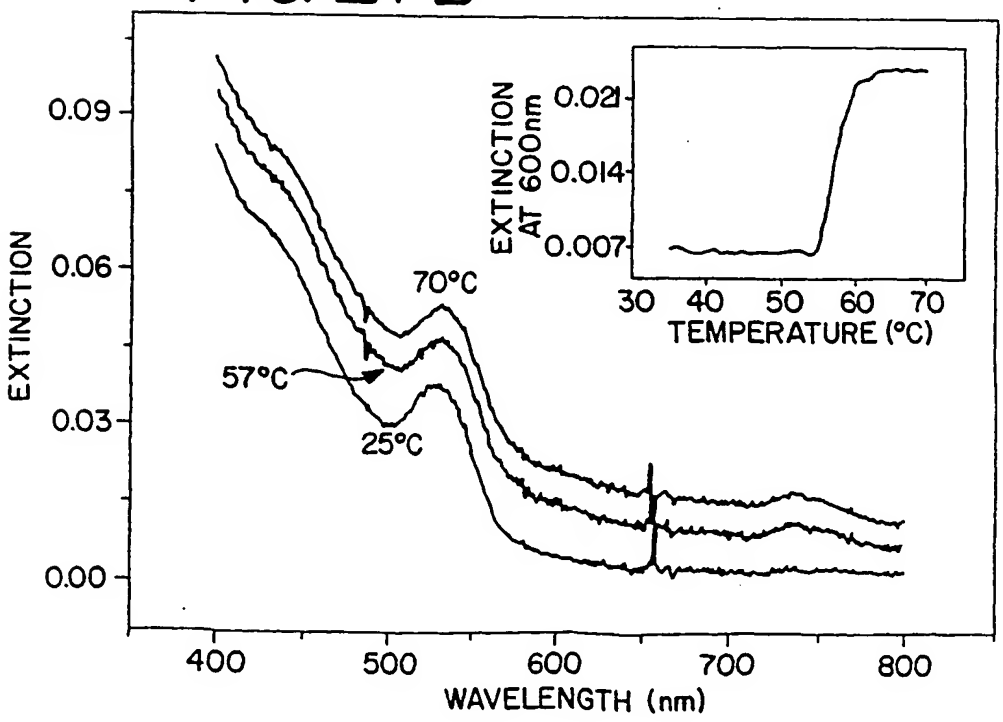


FIG. 27C

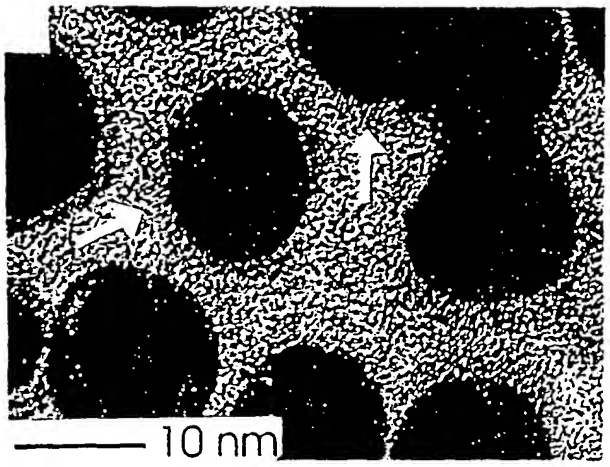


FIG. 27D

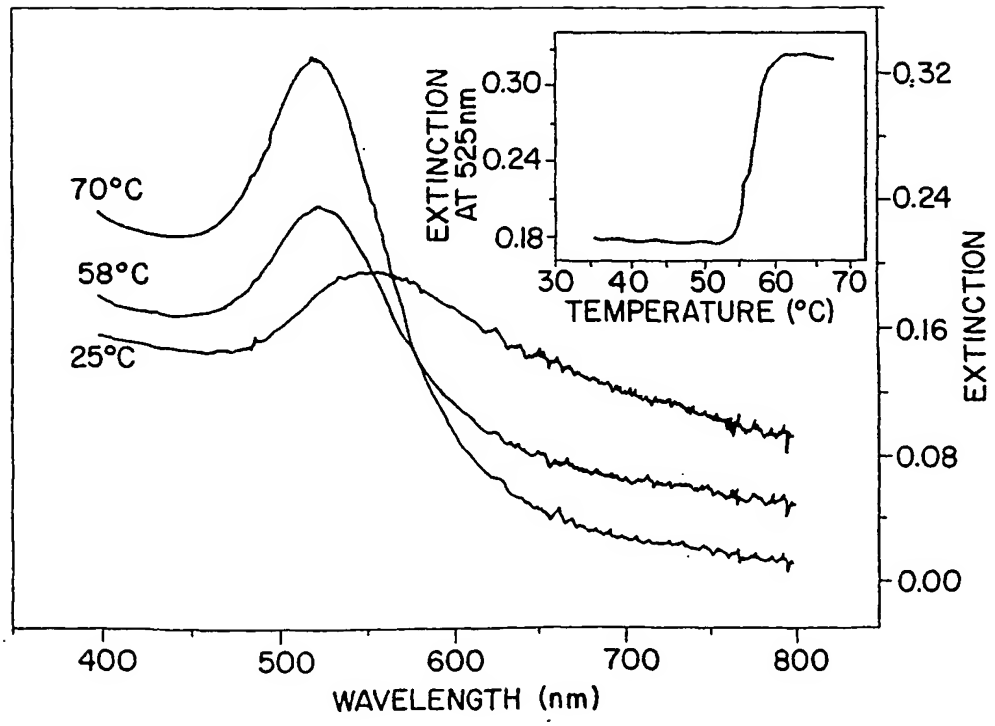


FIG. 28A

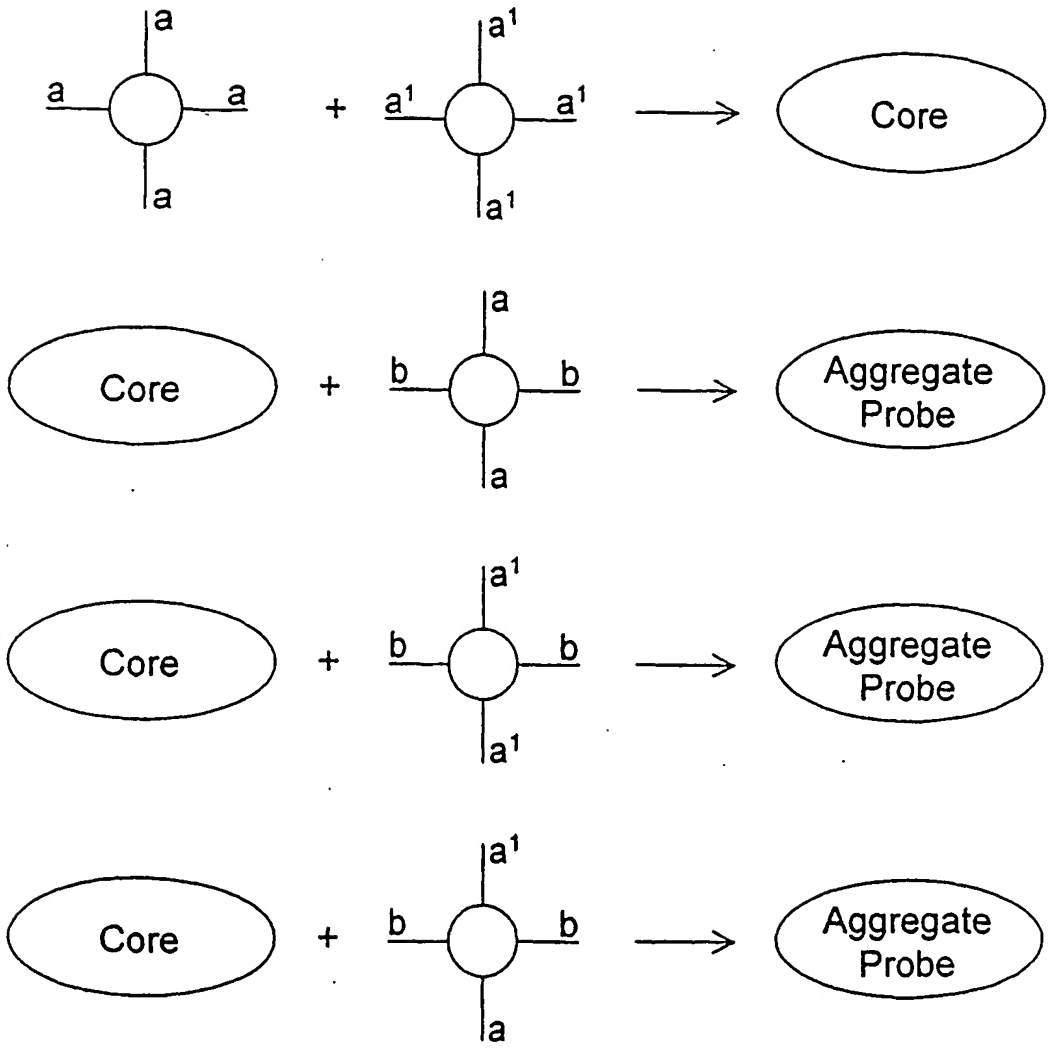

a
a
a
a
+
a1
a1
a1
a1
Core
Core
+
a
b
b
a
Aggregate Probe
Core
+
a1
b
b
a1
Aggregate Probe
Core
+
a1
b
b
a
Aggregate Probe

FIG. 28B

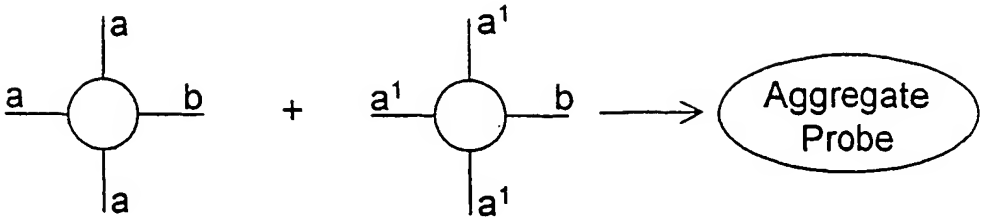


FIG. 28C

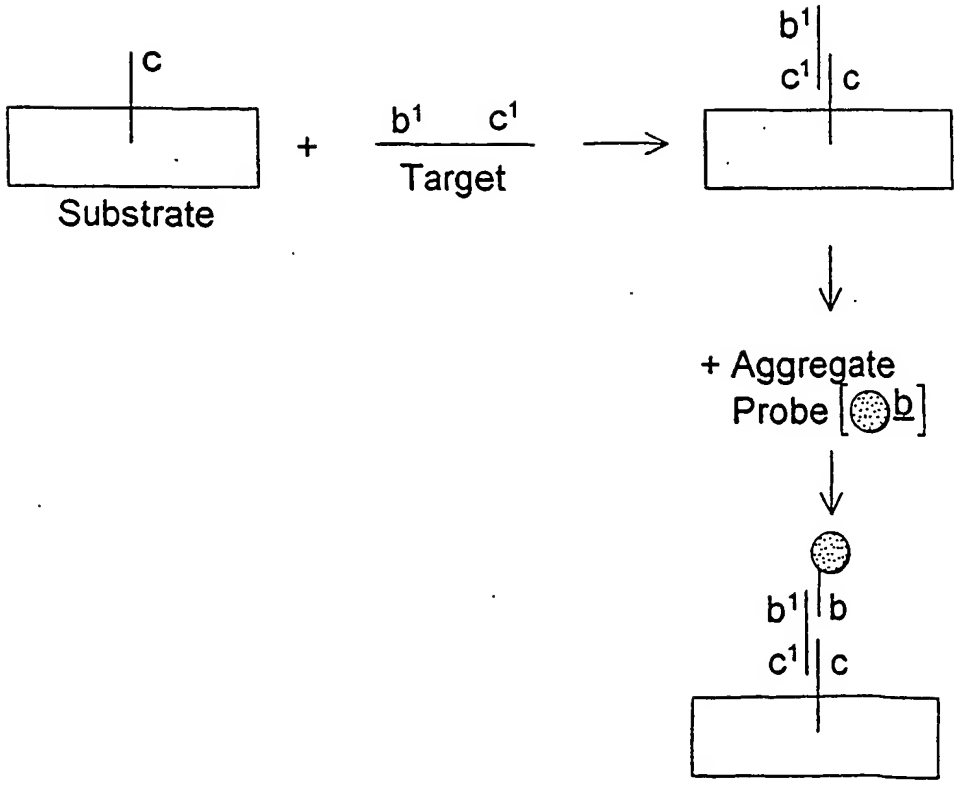


FIG. 28D

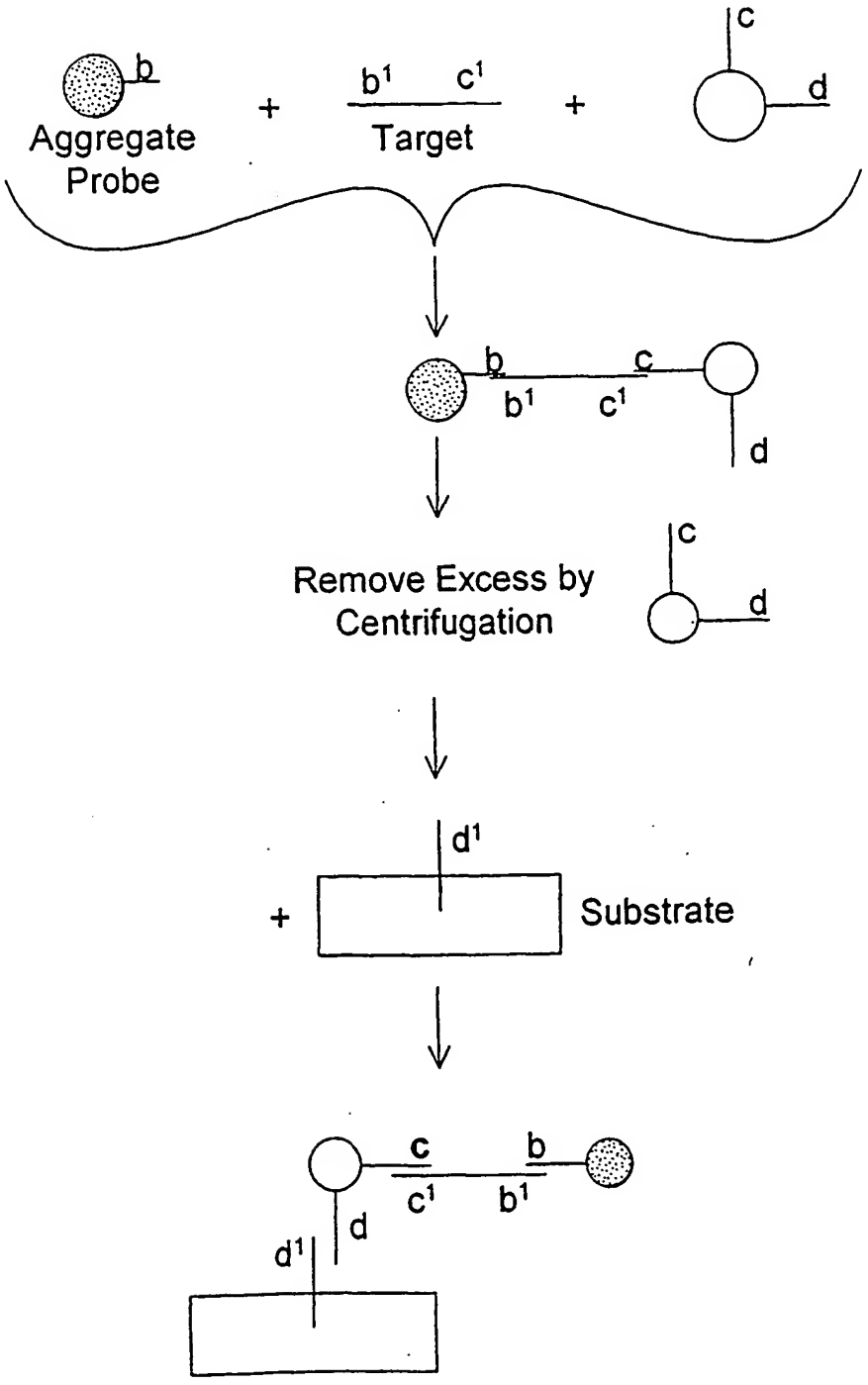
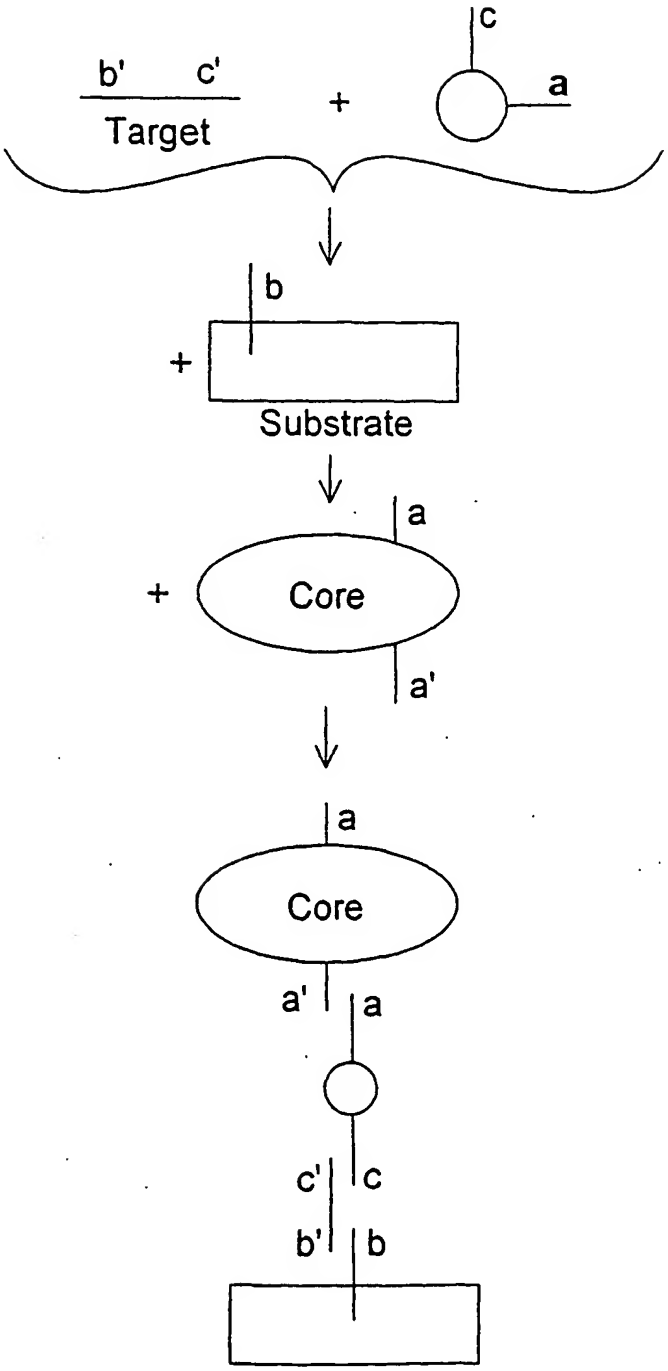

b
Aggregate Probe
+
b1 c1
Target
+
c
d
b
c
b1
c1
d
Remove Excess by Centrifugation
c
d
d1
+
Substrate
c
b
c1
b1
d
d1

FIG. 28E



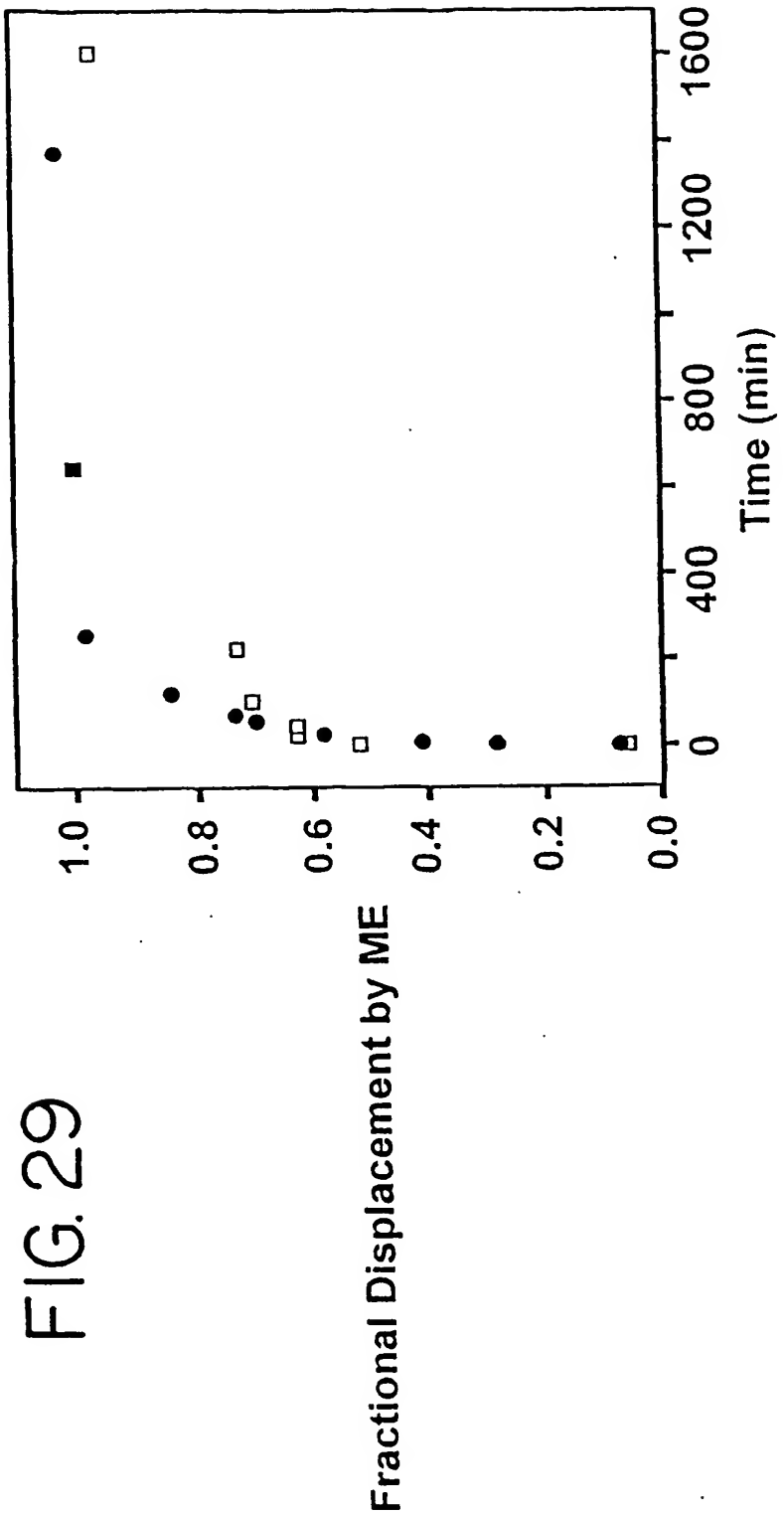

Fractional Displacement by ME
1.0
0.8
0.6
0.4
0.2
0.0
0
400
800
1200
1600
Time (min)

FIG. 29

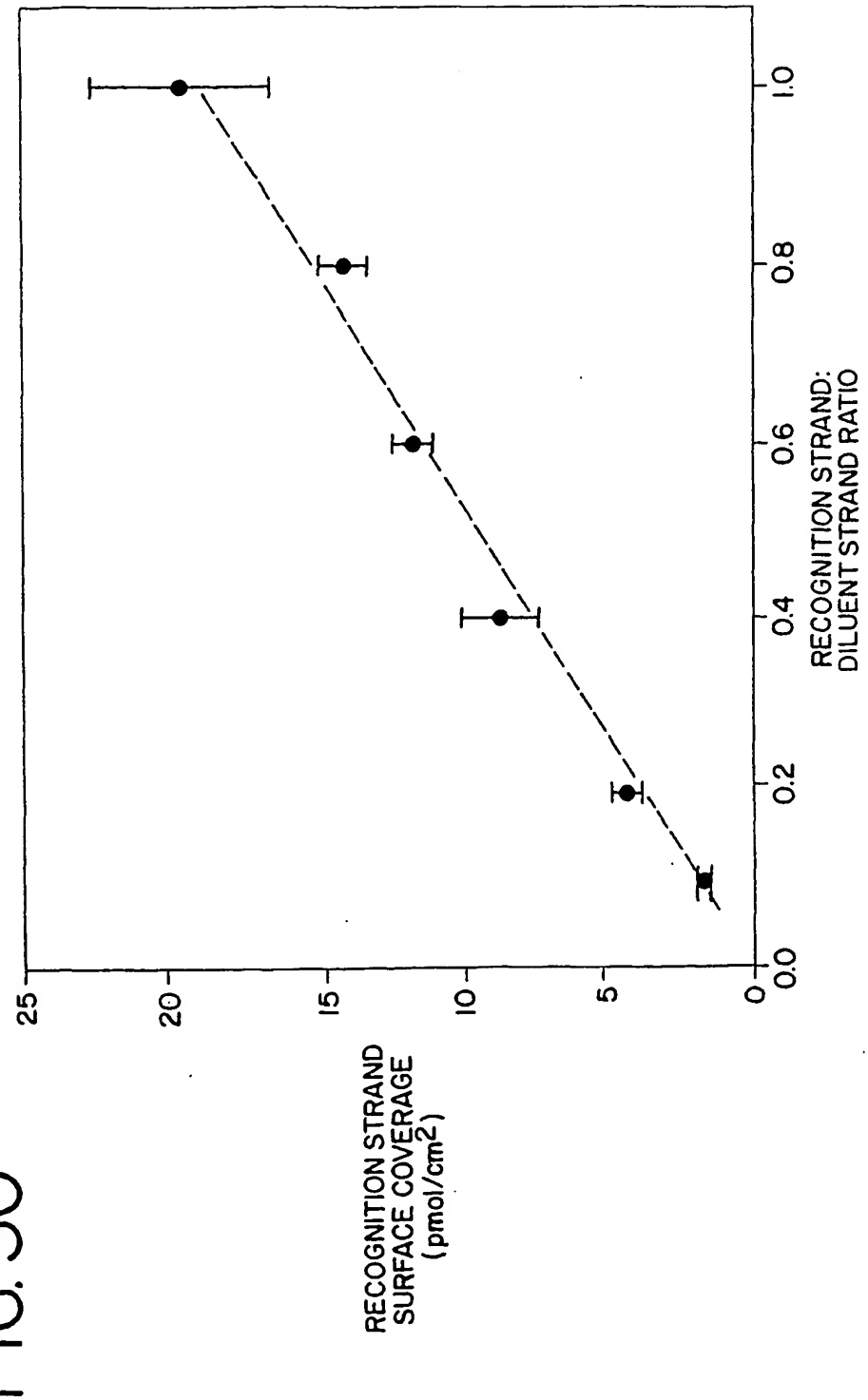

RECOGNITION STRAND SURFACE COVERAGE (pmol/cm2)
25
20
15
10
5
0
0.0
0.2
0.4
0.6
0.8
1.0
RECOGNITION STRAND: DILUENT STRAND RATIO

FIG. 30

FIG. 31

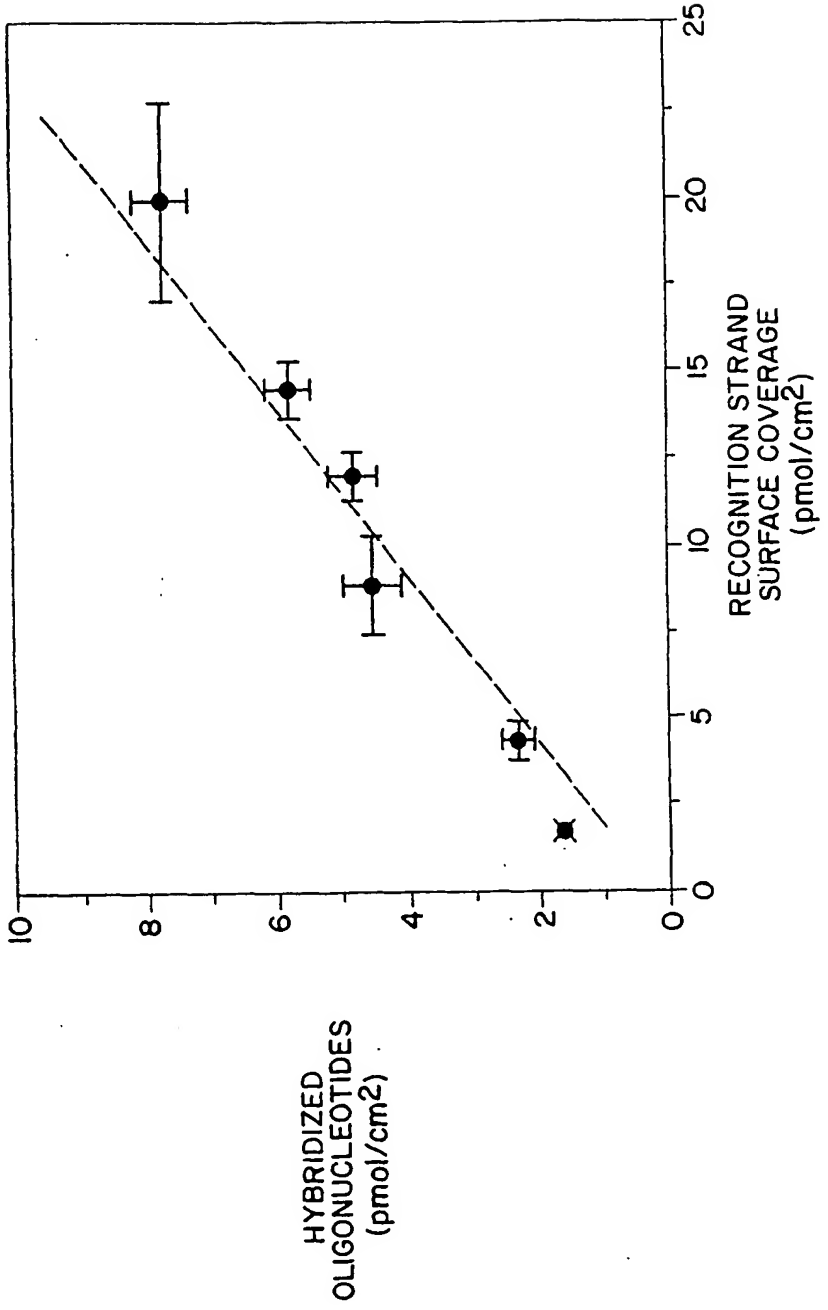
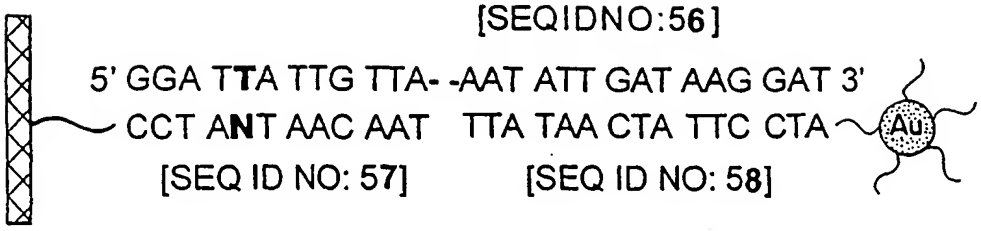

HYBRIDIZED OLIGONUCLEOTIDES (pmol/cm2)
RECOGNITION STRAND SURFACE COVERAGE (pmol/cm2)
0
2
4
6
8
10
0
5
10
15
20
25

FIG. 32



N = A (complementary),
G,C,T (mismatched)

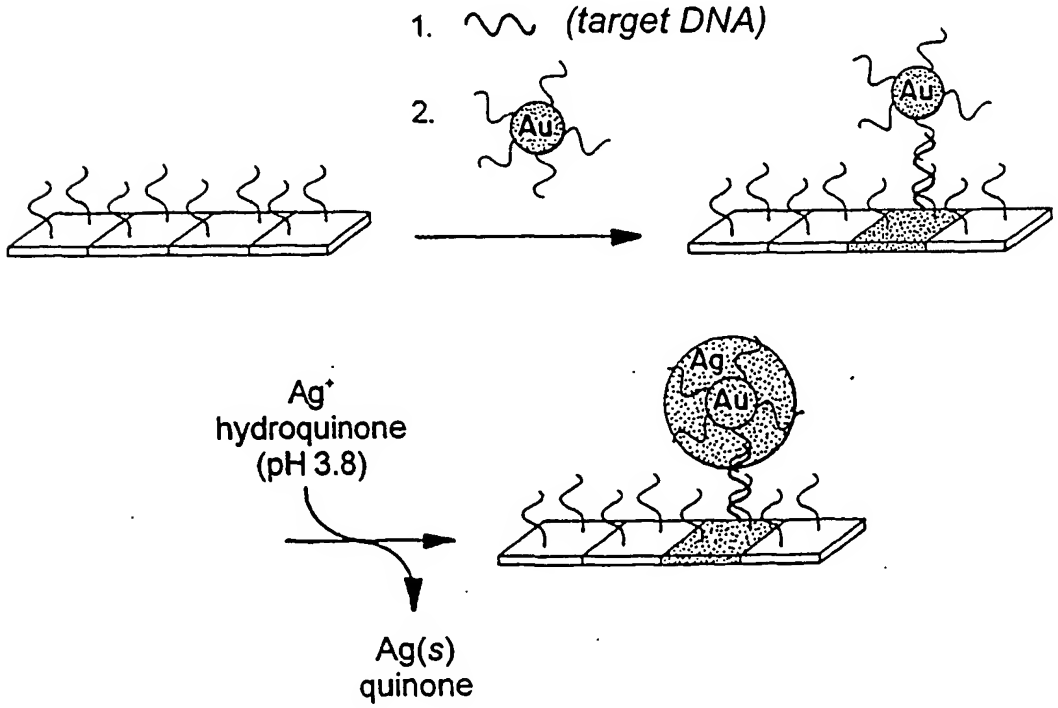
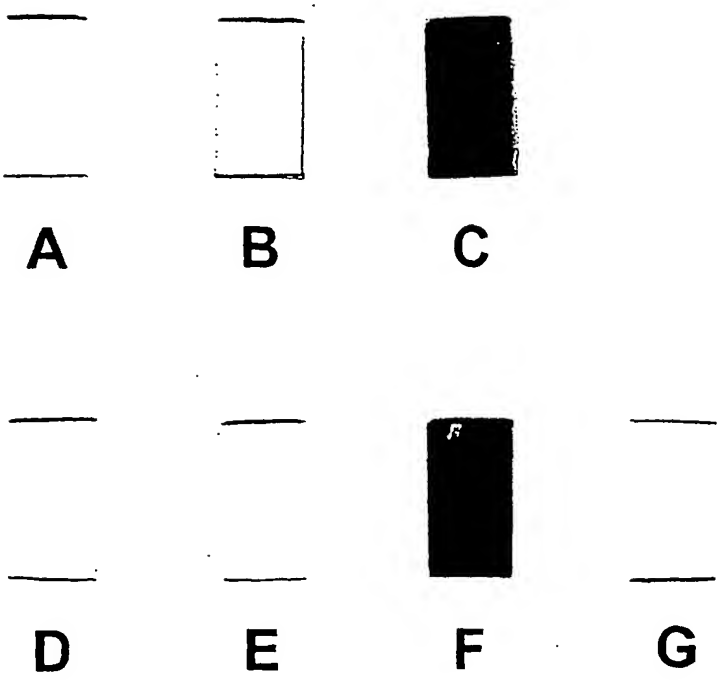


FIG. 33



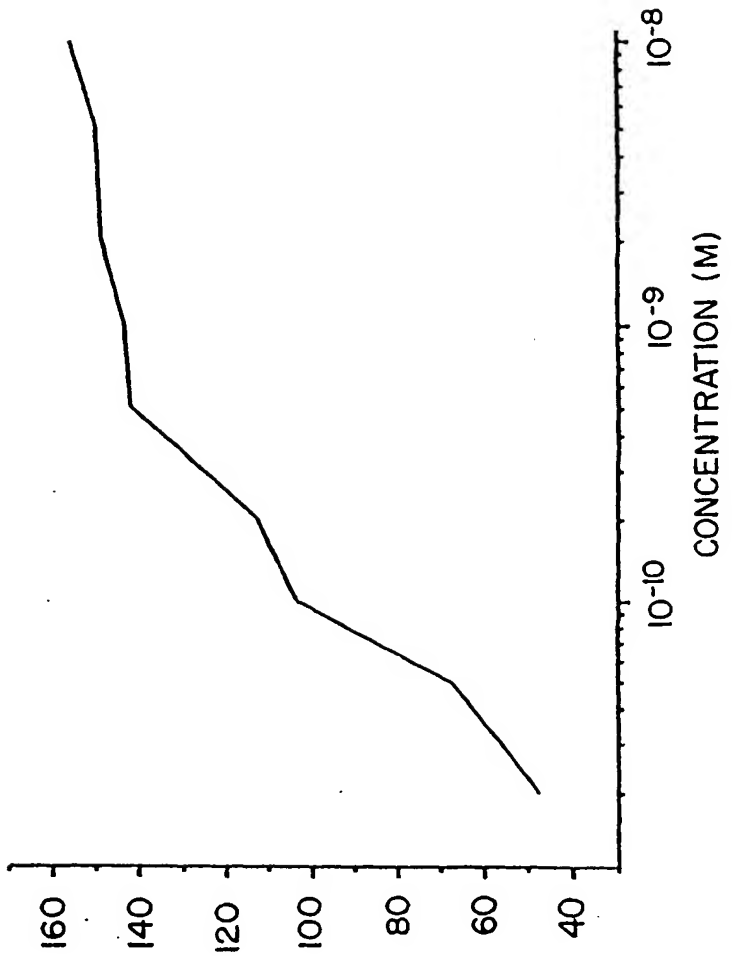

160
140
120
100
80
60
40
GREYSCALE, 256-bit
10-10
10-9
10-8
CONCENTRATION (M)

FIG. 34

FIG.35A

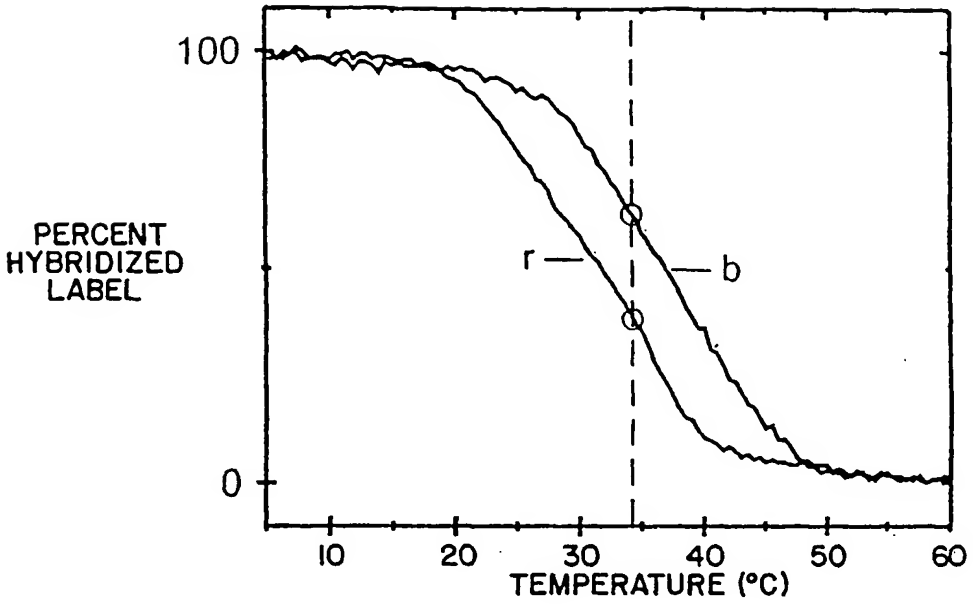


FIG.35B

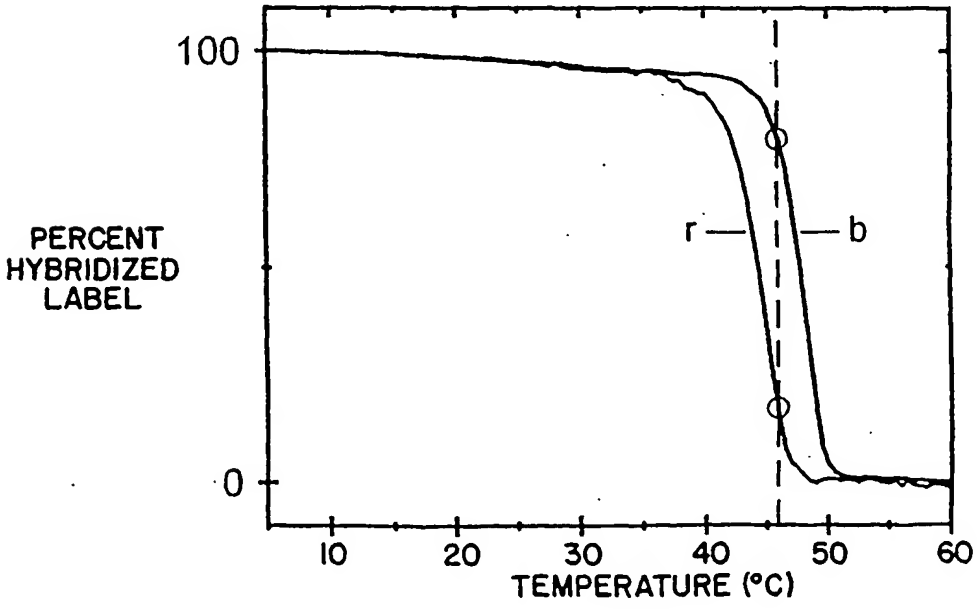


FIG. 36A

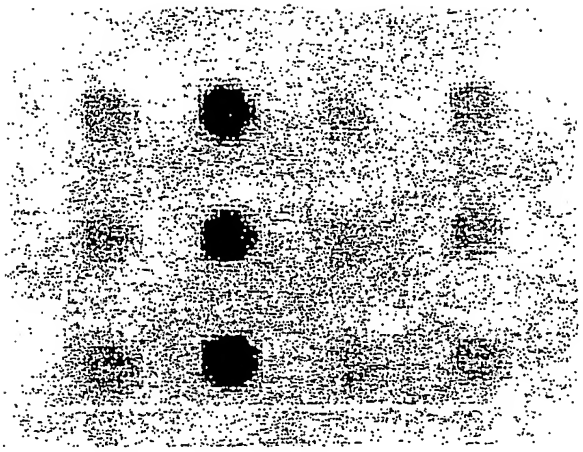


FIG. 36B

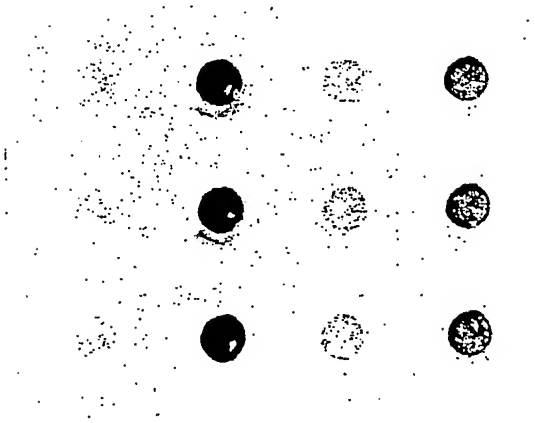


FIG.37A

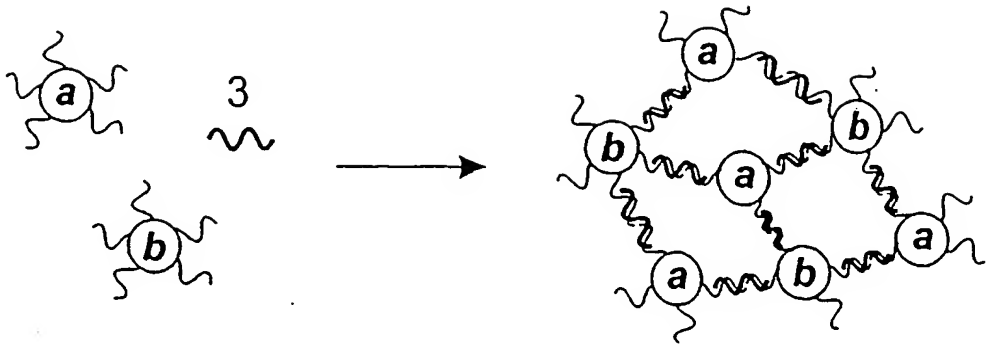


FIG.37B

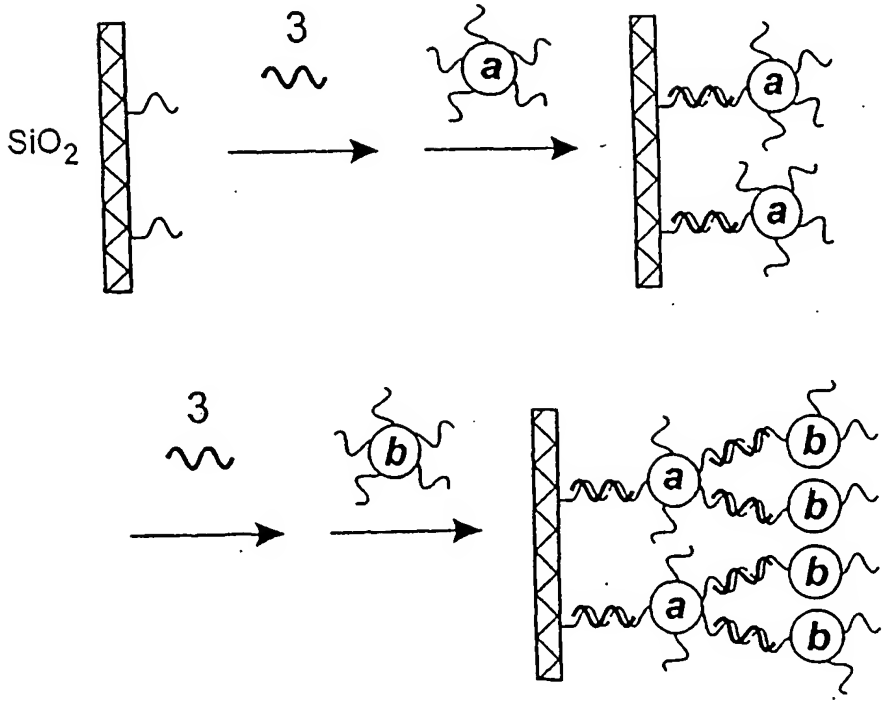


FIG. 38A

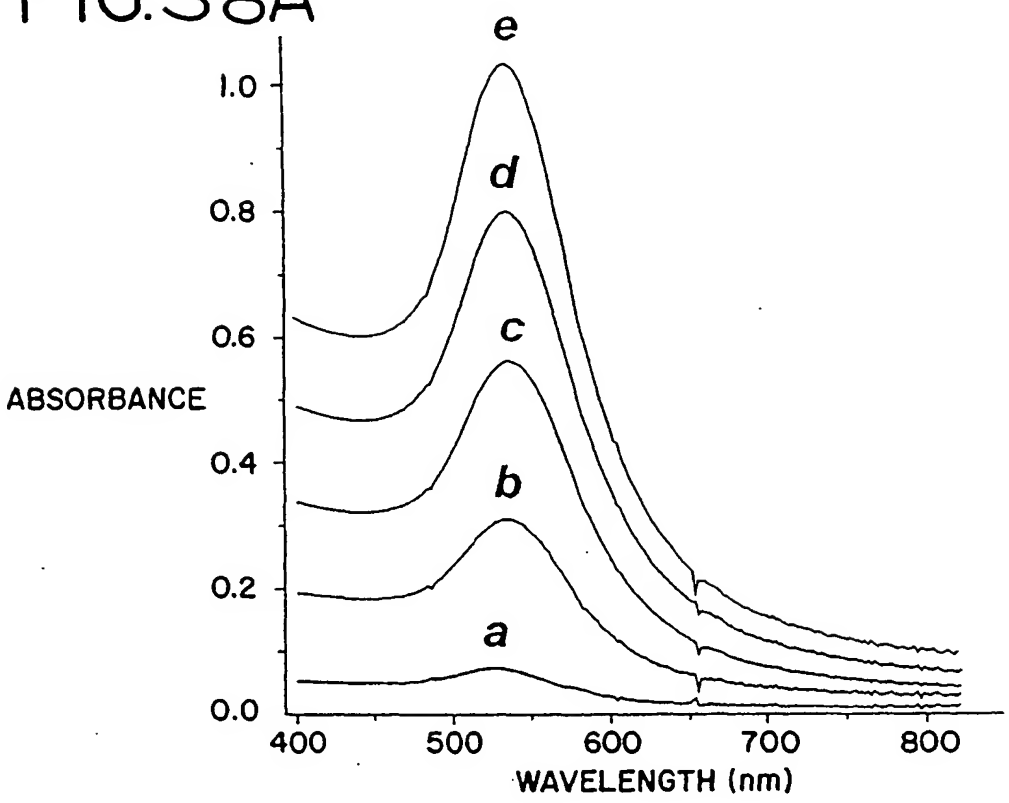


FIG. 38B

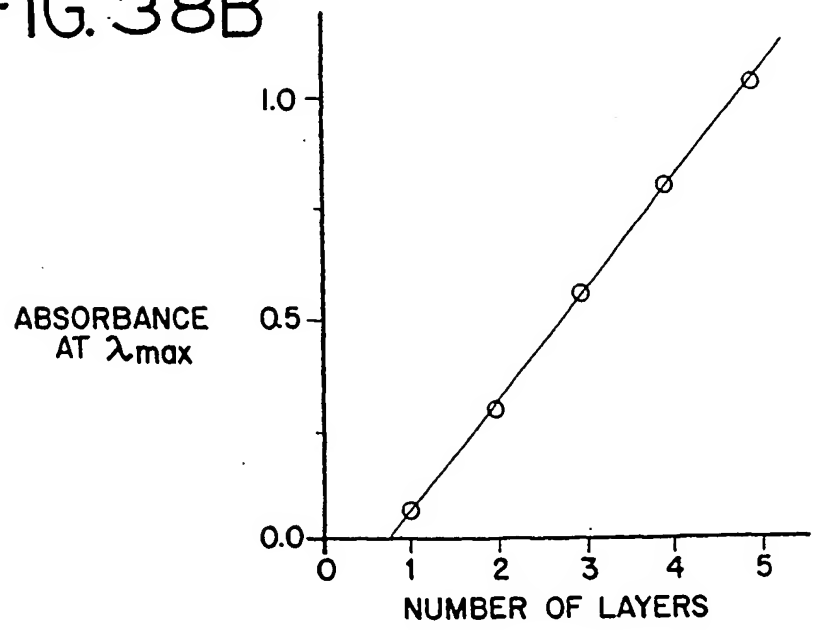


FIG. 39A

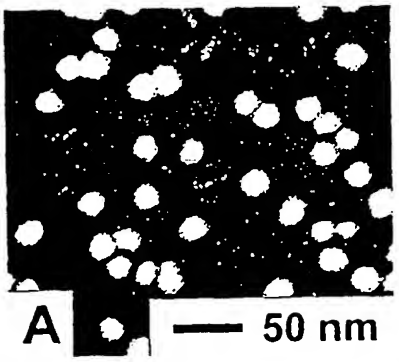


FIG. 39B

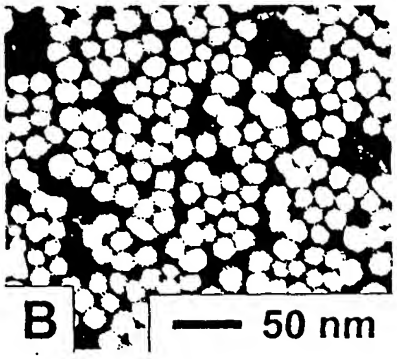


FIG.39C

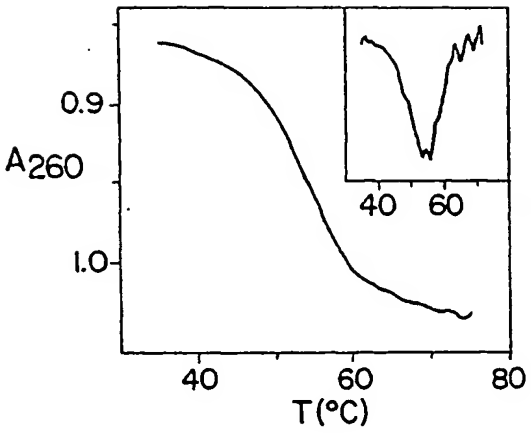


FIG.39D

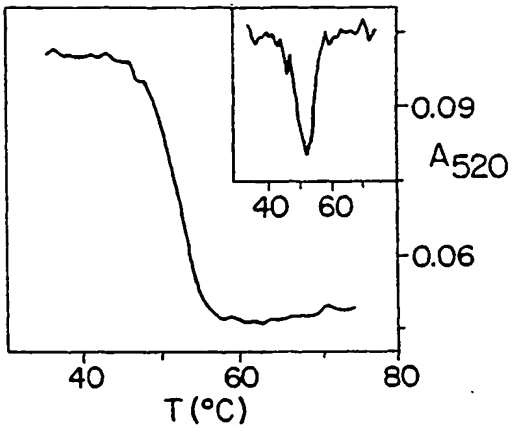


FIG.39E

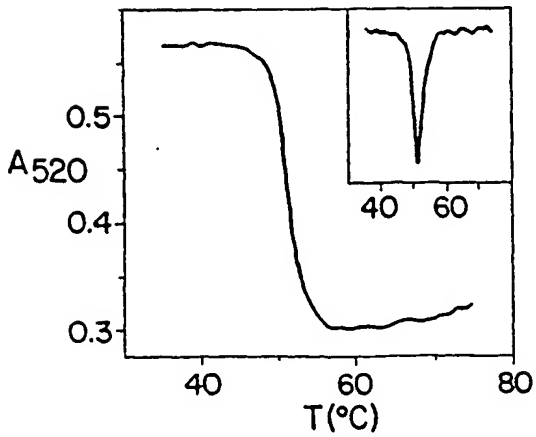


FIG.39F

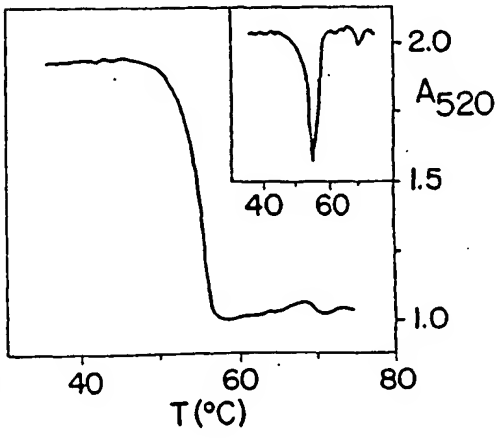


FIG. 40

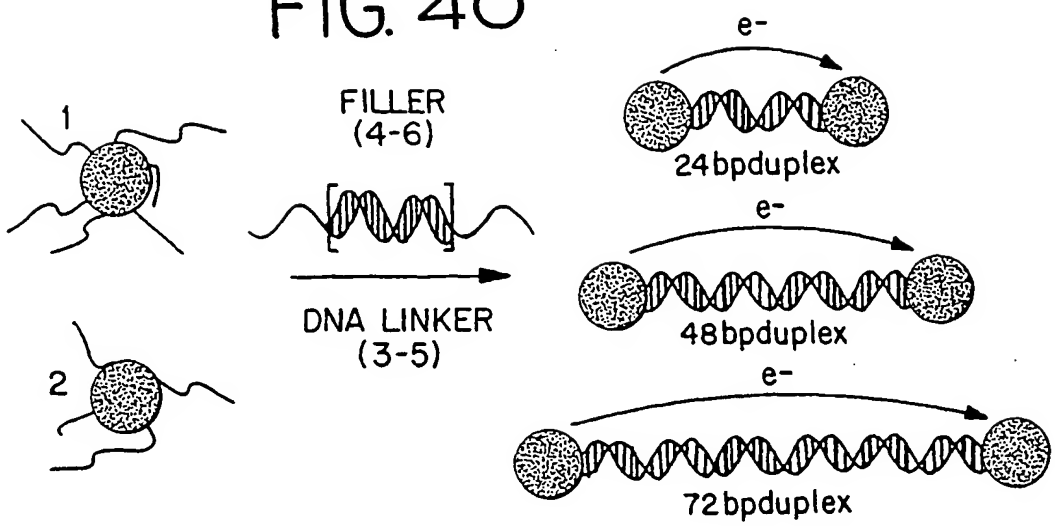

1
2
FILLER
(4-6)
DNA LINKER
(3-5)
e-
24bpduplex
e-
48bpduplex
e-
72bpduplex

FIG. 41

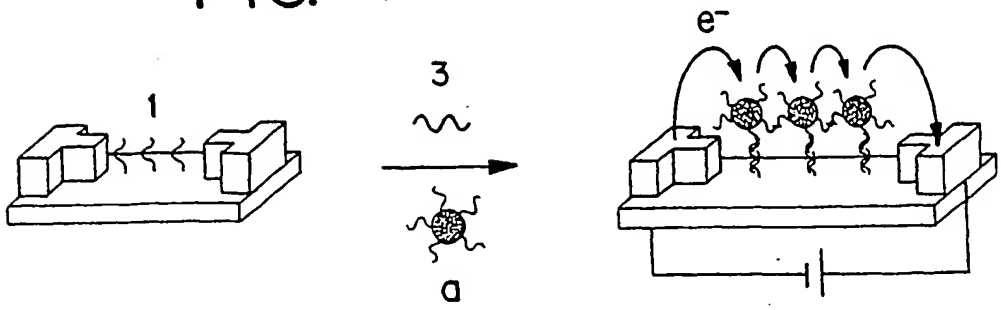
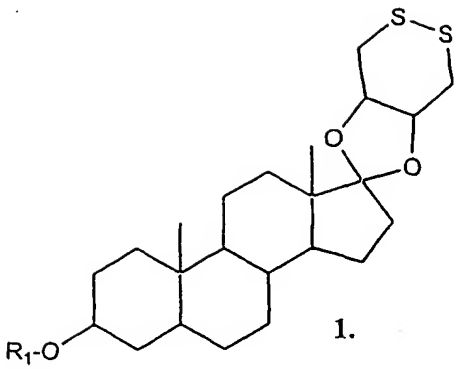

1
3
a
e-

FIG. 42



1.

II $HS-(CH_2)_6OR_1$

III $\begin{matrix} S-(CH_2)_6OR_1 \\ | \\ S-(CH_2)_6OH \end{matrix}$

R_1

a = H
b = $(iPr)_2NP(OCH_2CH_2CN)$-
c1 = 5'p(A_{20})-TATCGTTCCATCAGCT [SEQ ID NO: 65]
c2 = 5'-p(A_{20})-TTGATCTTCCGTTCT [SEQ ID NO: 66]
Target I = 79-mer oligonucleotide with target region:
3'-.....ATAGCAAGGTAGTCGAGCAACTAGAAAGGCAAGA.....5'
[SEQ ID NO: 67]

FIG. 43

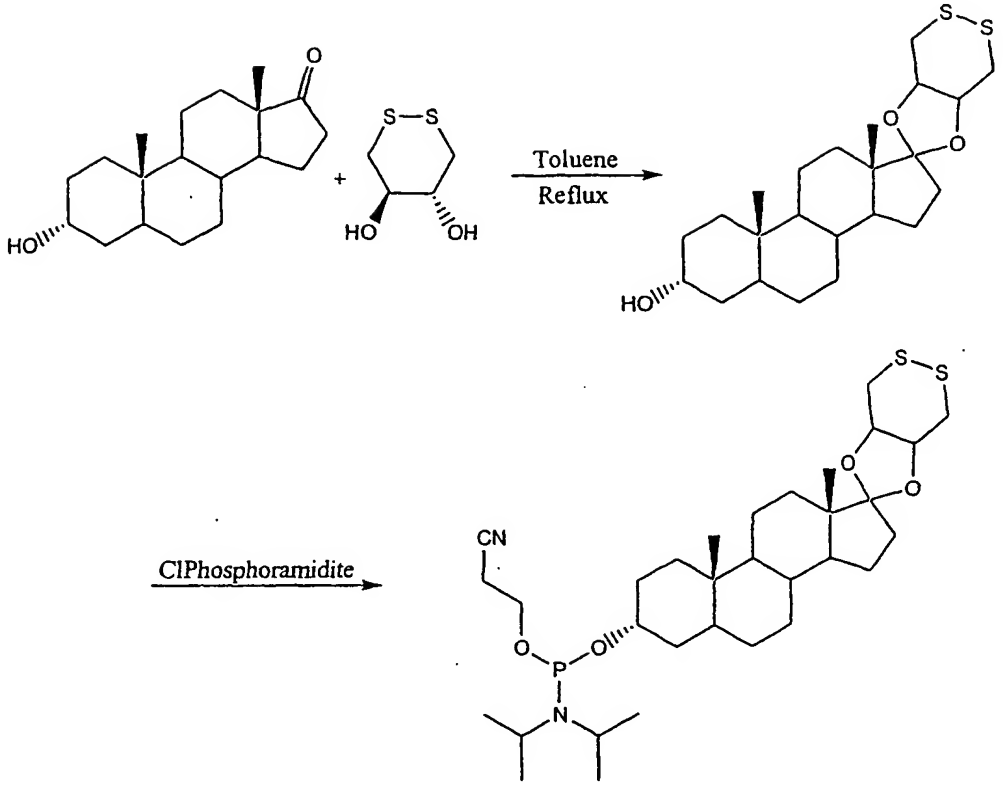
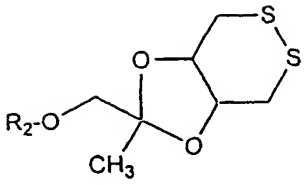


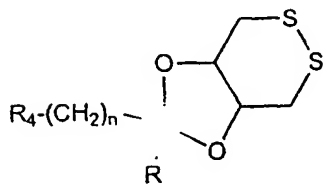
FIG. 44



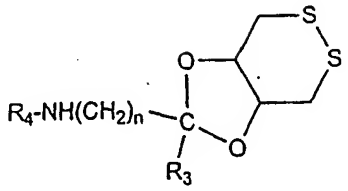
2.

R_2

a = H
b = $(iPr)_2NP(OCH_2CH_2CN)$-
c1 = 5'-p(A_{20})-GCAGACCTCA [SEQ ID NO: 68]
c2 = 5'-p(A_{20})-CCTATGTGTCG [SEQ ID NO: 69]
D = 5'-p(A_{20}) [SEQ ID NO: 70]
Target I = 63-mer oligonucleotide with target region:
3'-.....CGTCTGGAGTGGATACACAGC.....5'
[SEQ ID NO: 71]



3.



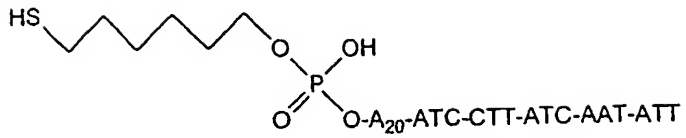
4.

R_3 = hydrogen, an alkyl group, an aryl group, or a substituted alkyl or aryl group

R_4 = an attached oligonucleotide or modified oligonucleotide

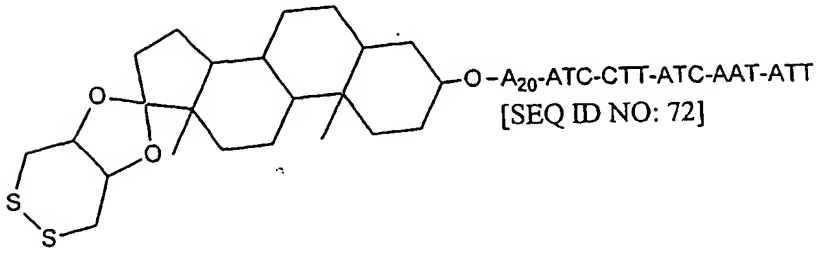
FIG. 45

5.



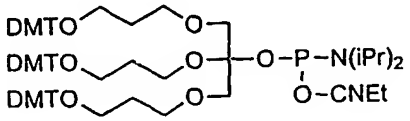
[SEQ ID NO: 72]

6.

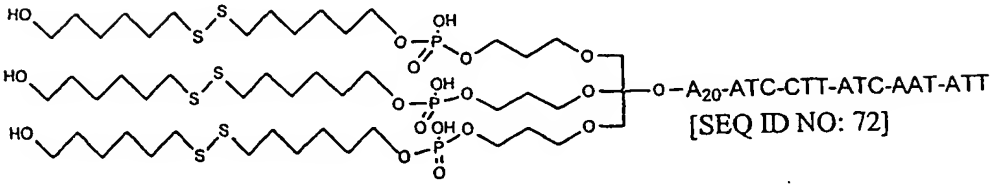


[SEQ ID NO: 72]

7.

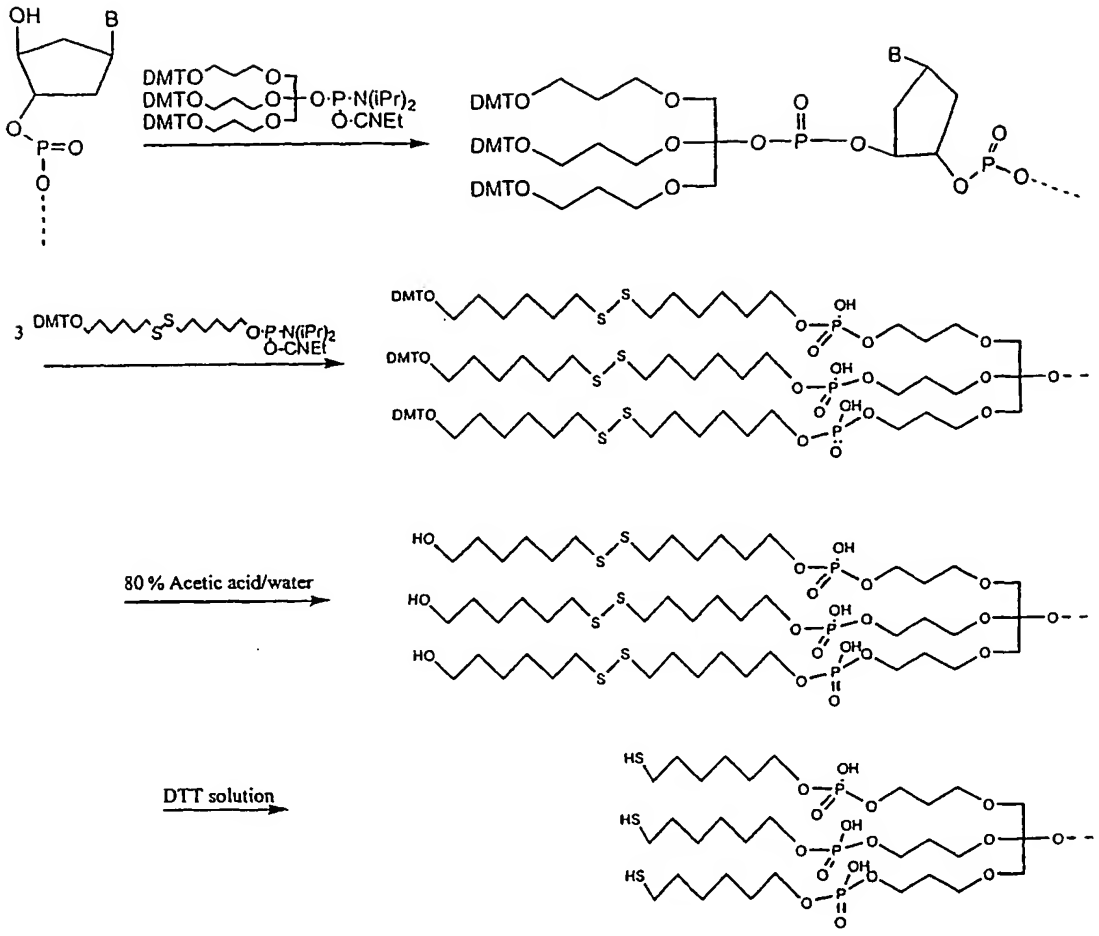


8.



[SEQ ID NO: 72]

FIG. 46


OH
B
DMTO
DMTO
DMTO
O·P·N(iPr)2
O·CNEt
P=O
O
3 DMTO
S
S
80 % Acetic acid/water
HO
HS
DTT solution

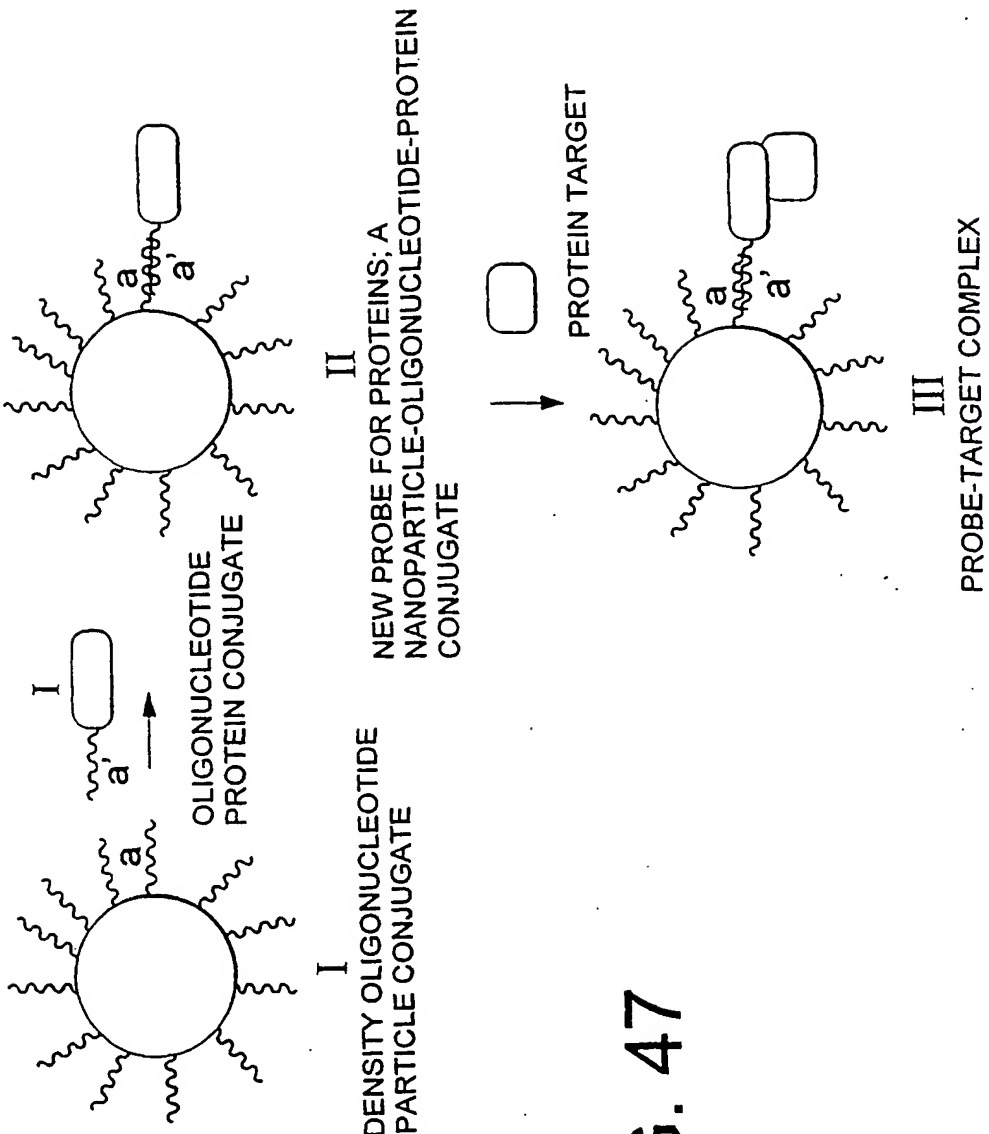
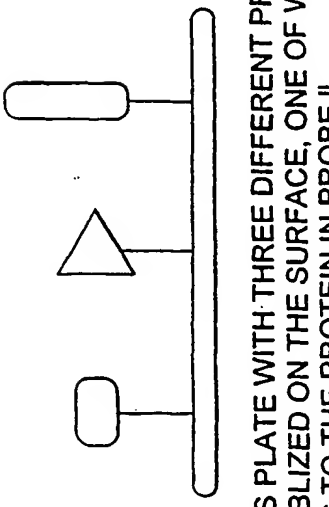
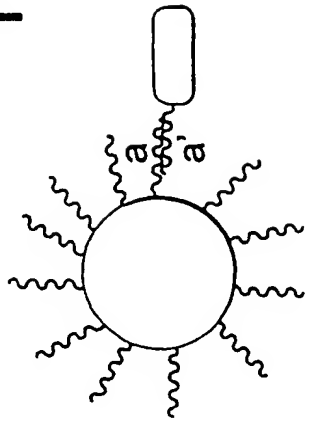

I
HIGH DENSITY OLIGONUCLEOTIDE NANOPARTICLE CONJUGATE
a
a'
OLIGONUCLEOTIDE PROTEIN CONJUGATE
II
NEW PROBE FOR PROTEINS; A NANOPARTICLE-OLIGONUCLEOTIDE-PROTEIN CONJUGATE
PROTEIN TARGET
III
PROBE-TARGET COMPLEX

FIG. 47

FIG. 48



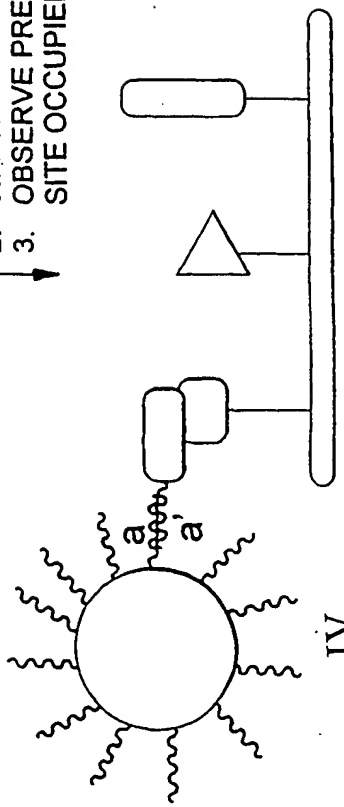
GLASS PLATE WITH THREE DIFFERENT PROTEINS IMMOBLIZED ON THE SURFACE, ONE OF WHICH BINDS TO THE PROTEIN IN PROBE II



II

NEW PROBE FOR PROTEINS; A NANOPARTICLE-OLIGONUCLEOTIDE-PROTEIN CONJUGATE

1. EXPOSE PLATE TO THE PROBE SOLUTION
2. WASH AWAY UNBOUND NANOPARTICLE PROBE
3. OBSERVE PRESENCE OF BOUND NANOPARTICLES AT SITE OCCUPIED BY THE FIRST PROTEIN IN THE SERIES.



IV

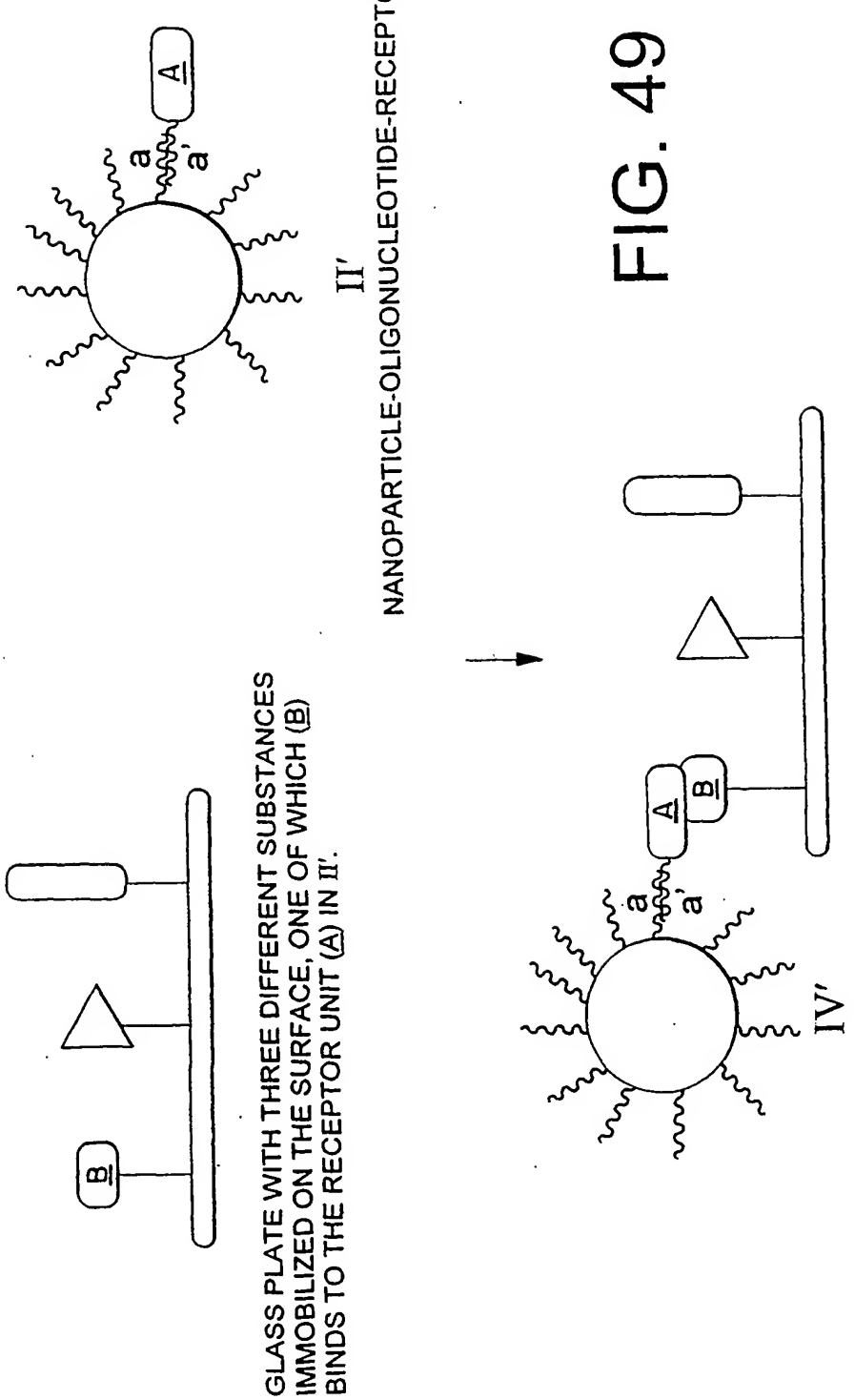

A
a
a'
II'
NANOPARTICLE-OLIGONUCLEOTIDE-RECEPTOR
B
GLASS PLATE WITH THREE DIFFERENT SUBSTANCES
IMMOBILIZED ON THE SURFACE, ONE OF WHICH (B)
BINDS TO THE RECEPTOR UNIT (A) IN II'.
A
B
a
a'
IV'

FIG. 49

FIG. 50A

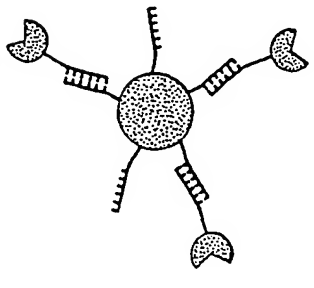


FIG. 50B

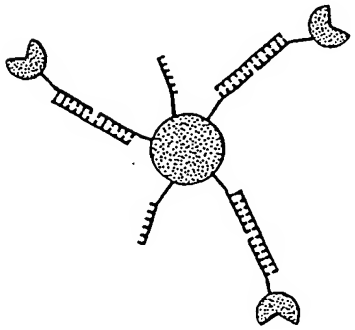


FIG. 51A

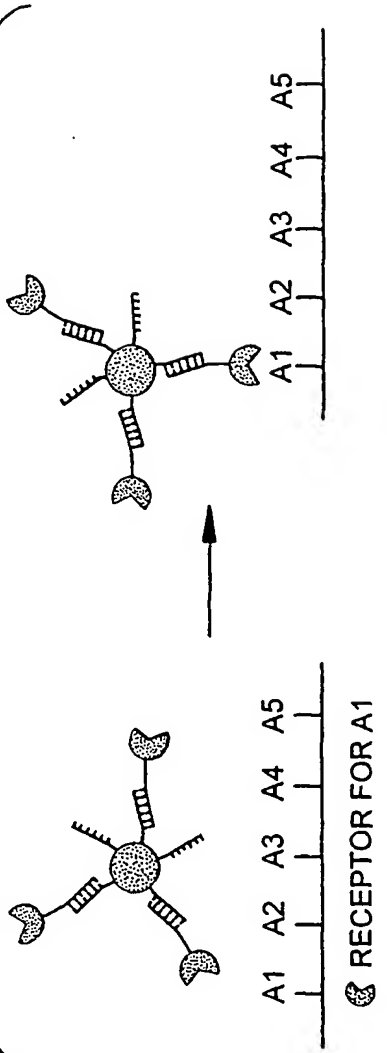


FIG. 51B

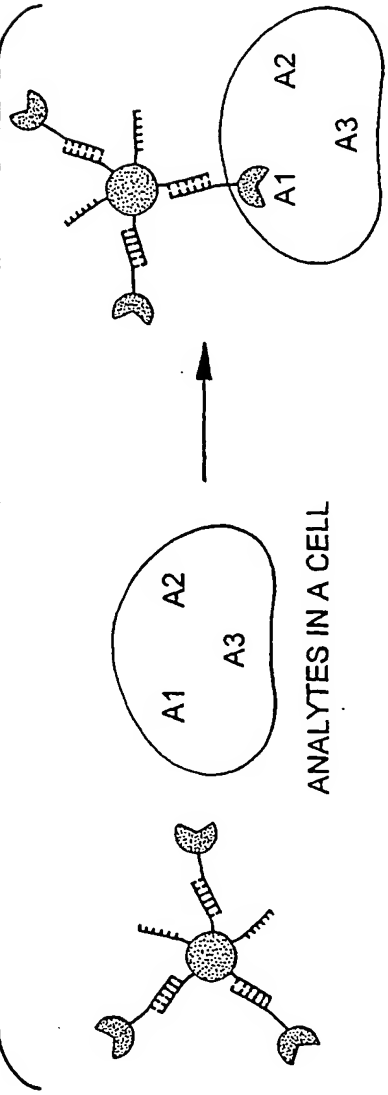
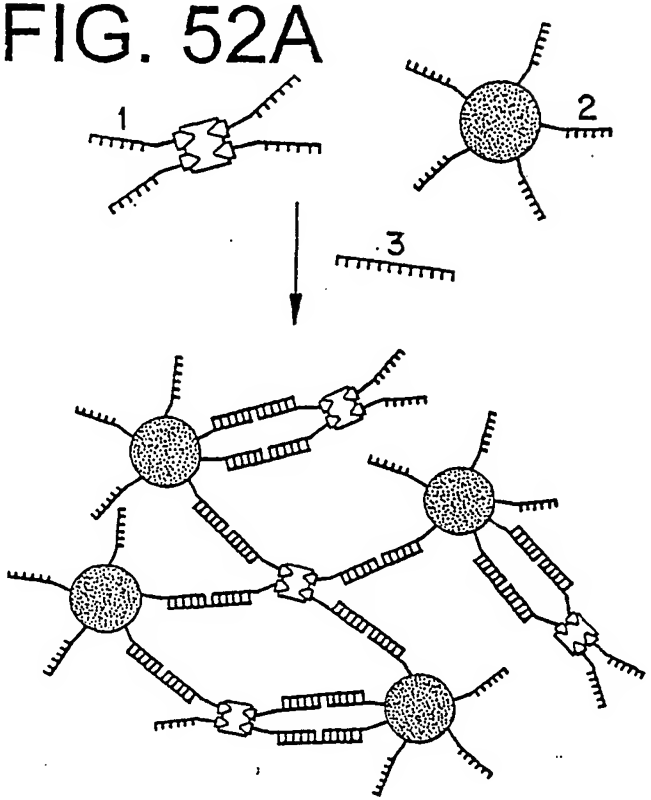


FIG. 52A



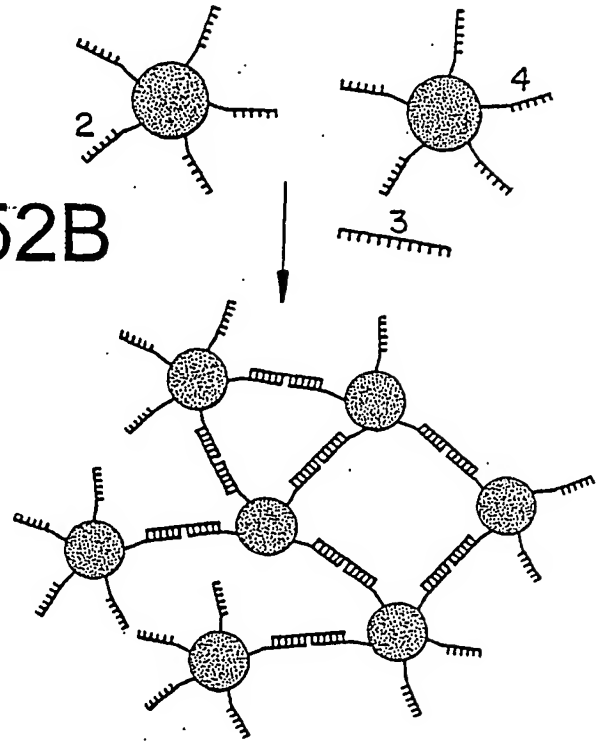
1 3' biotin-TEG-A_{10}-ATG CTC AAC TCT 5' [SEQ. ID NO. 73]

2 5' $SH(CH_2)_6$-A_{10}-CGC ATT CAG GAT 3' [SEQ. ID NO. 74]

3 5' TAC GAG TTG AGA ATC CTG AAT GCG 3' [SEQ. ID NO. 75]

13 nm Au NANOPARTICLES STREPTAVIDIN

FIG. 52B



2 5' $SH(CH_2)_6$-A_{10}-CGC ATT CAG GAT 3'

3 5' TAC GAG TTG AGA ATC CTG AAT GCG 3'

4 3' $SH(CH_2)_3$-A_{10}-ATG CTC AAC TCT 5'

13 nm Au NANOPARTICLES

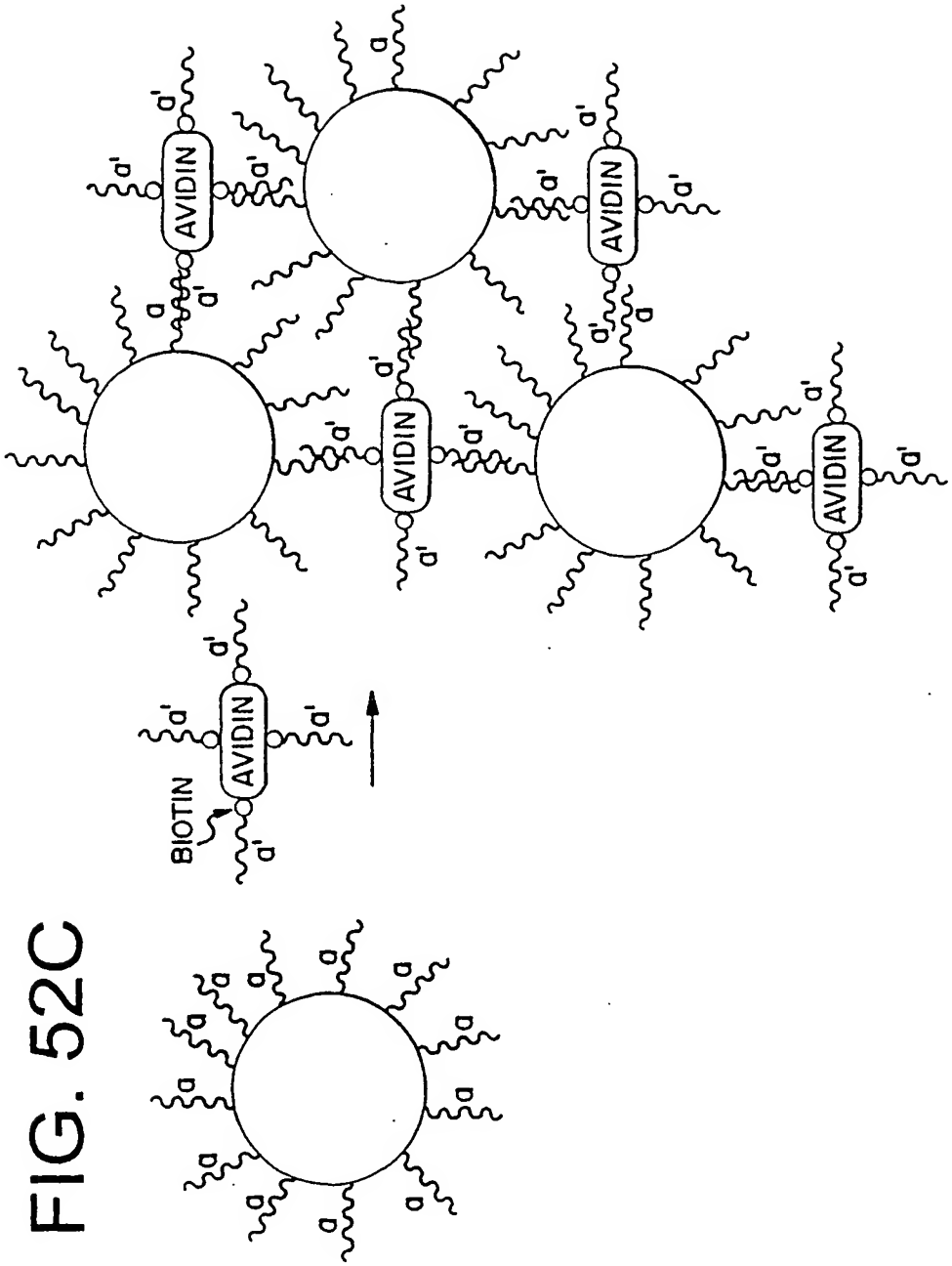
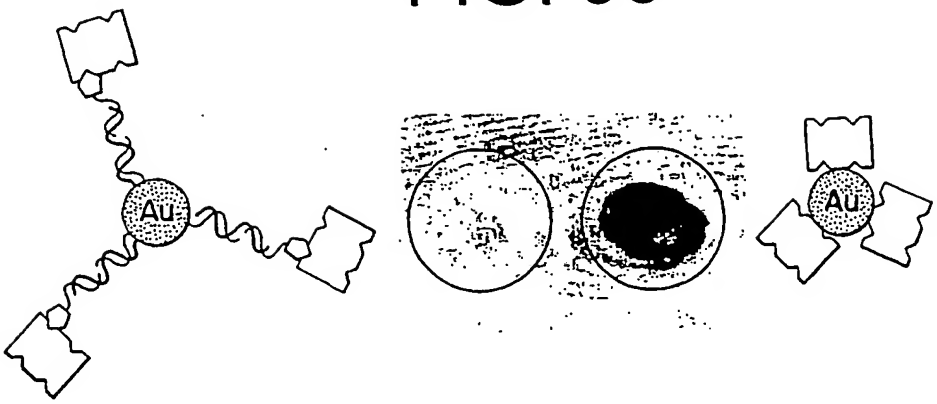


FIG. 52C

FIG. 53



Au COLLOID / DNA / STREPTAVIDIN CONJUGATE vs. Au COLLOID / STREPTAVIDIN CONJUGATE

FIG. 54

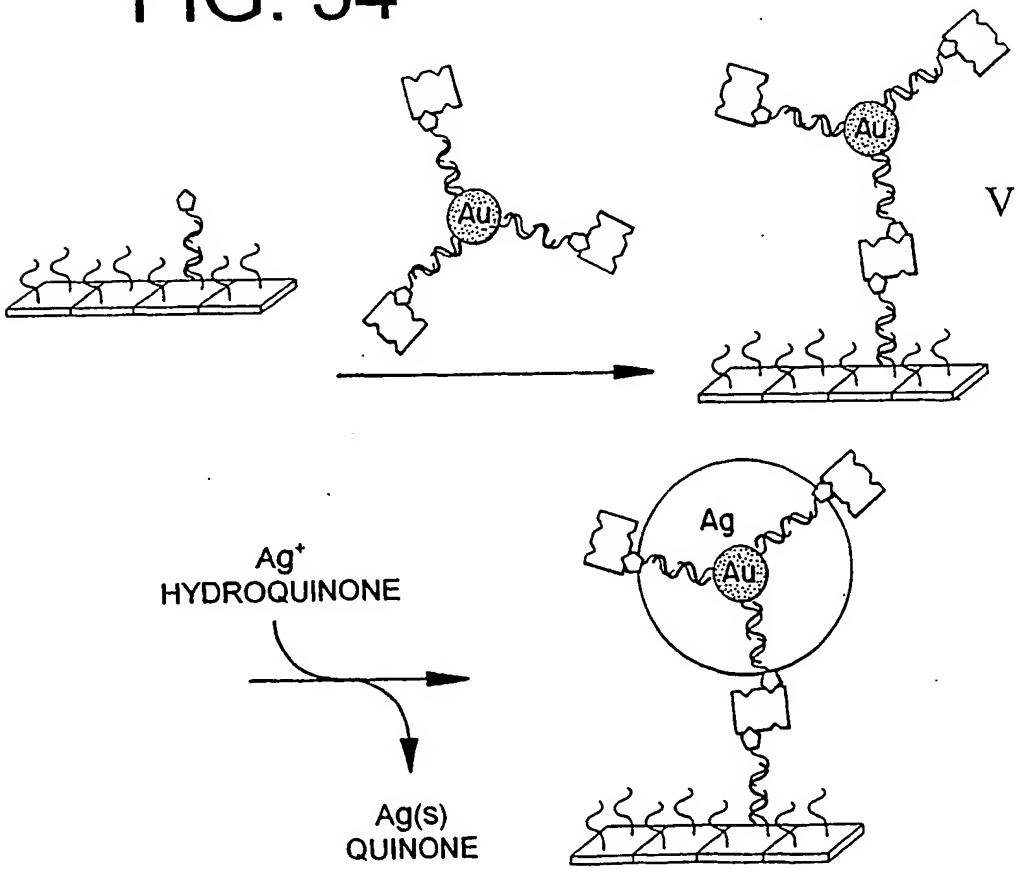


FIG. 55

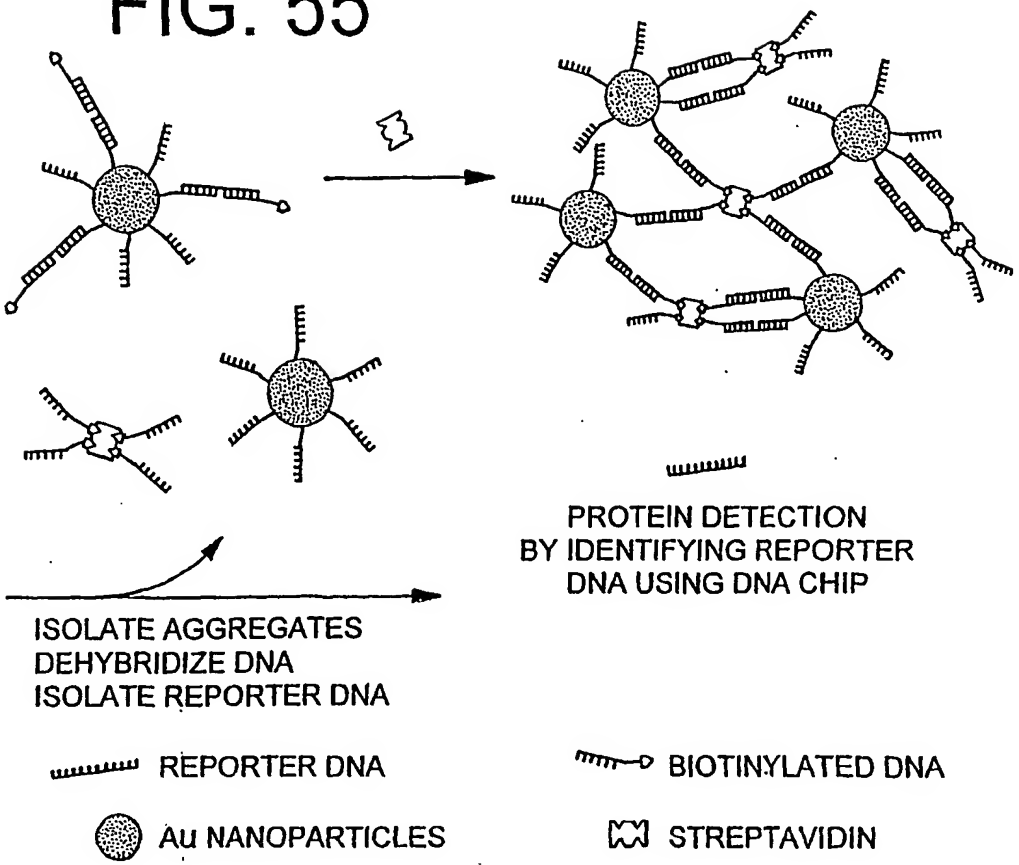
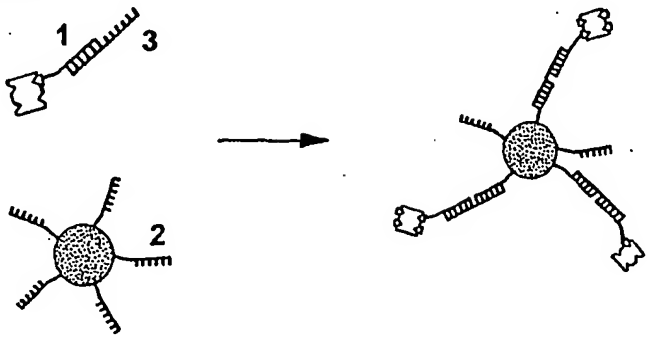


FIG. 56



1 3' BIOTIN-TEG-A_{10}-ATG CTC AAC TCT 5' [SEQ.ID NO: 73]
2 5' $SH(CH_2)_6$-A_{10}-CGC ATT CAG GAT 3' [SEQ. ID NO: 74]
3 5' TAC GAG TTG AGA ATC CTG AAT GCG 3' [SEQ. ID NO: 75]

13nm Au NANOPARTICLES
STREPTAVIDIN
LINKER DNA
BIOTINYLATED DNA

FIG. 57A

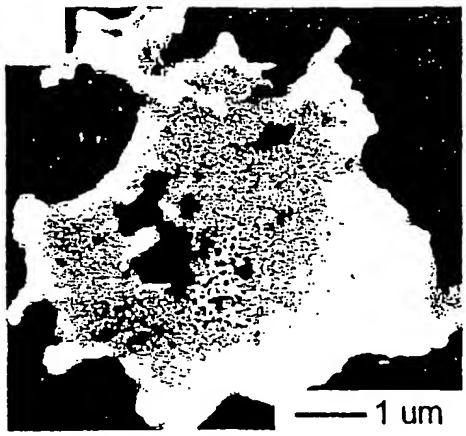


FIG. 57B

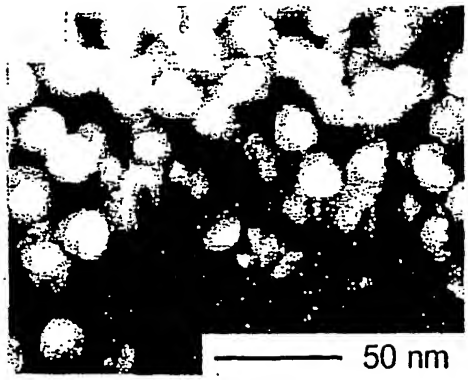


FIG. 58A

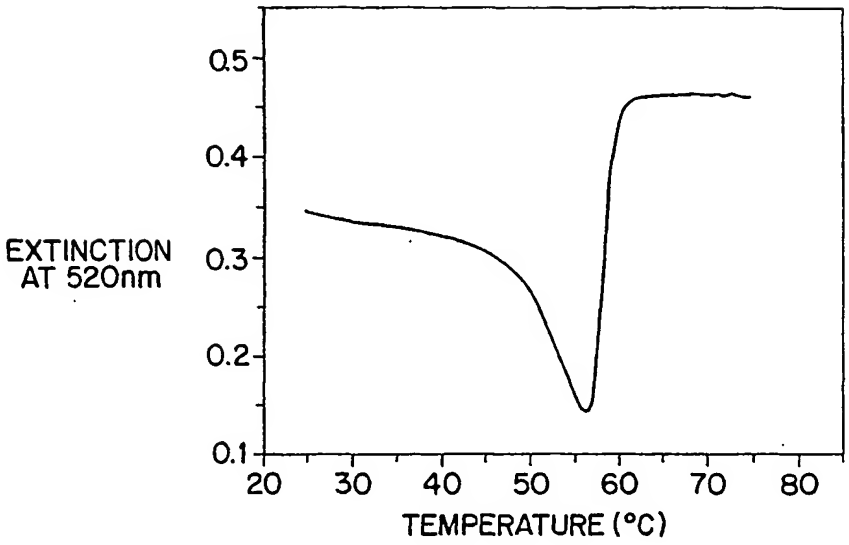


FIG. 58B

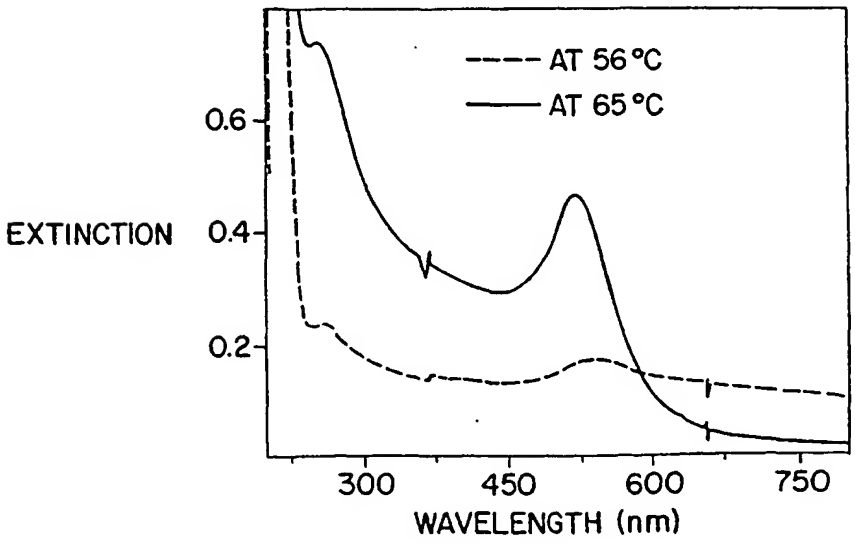


FIG. 59

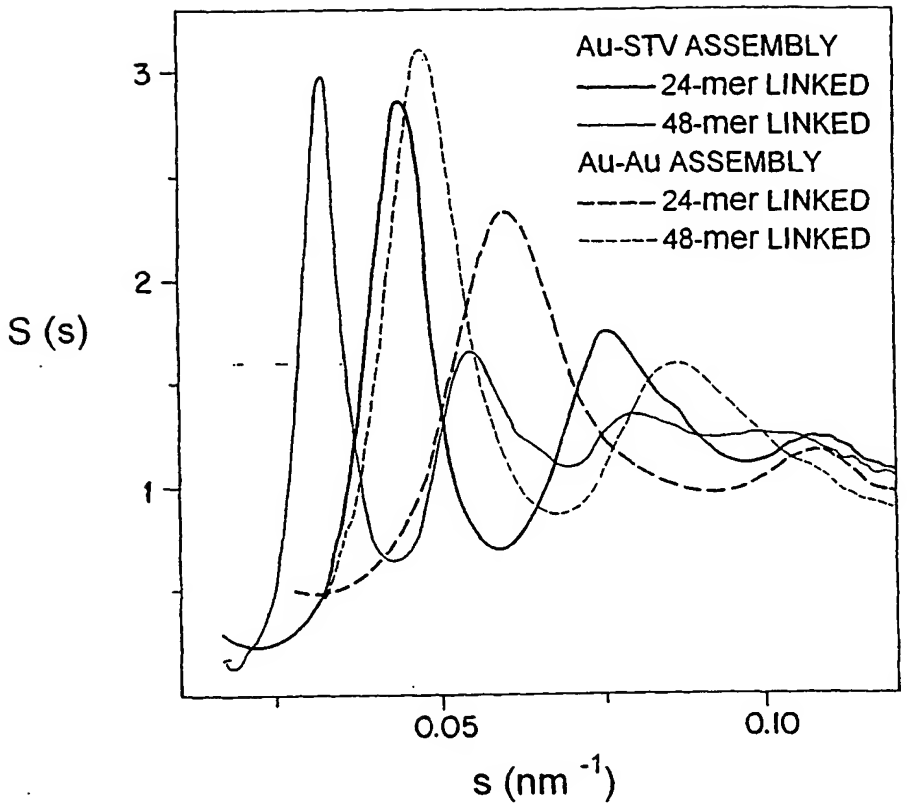
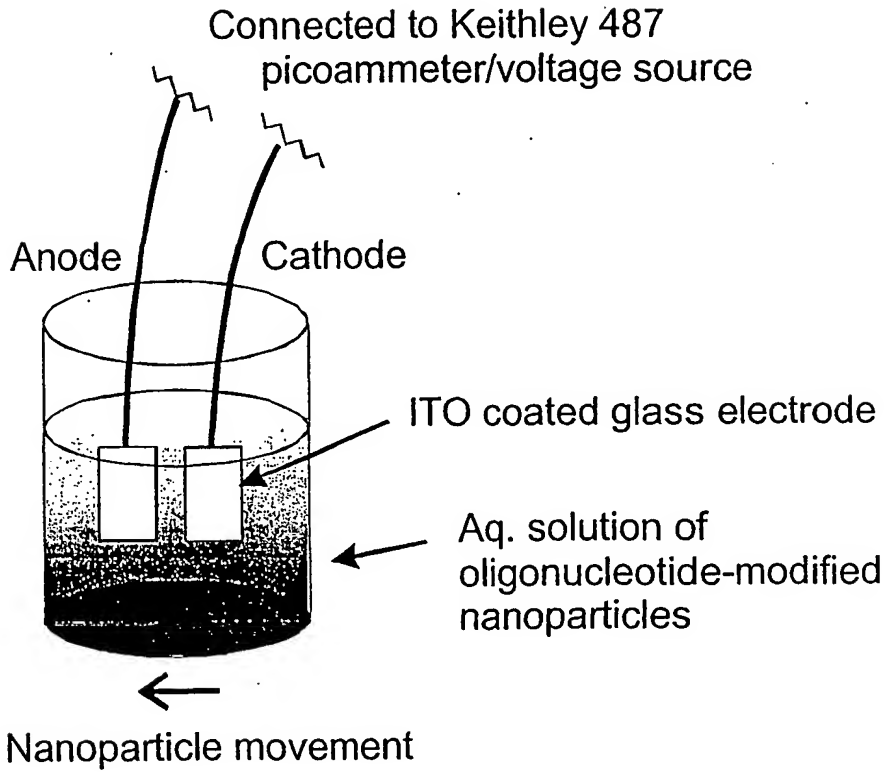

Au-STV ASSEMBLY
24-mer LINKED
48-mer LINKED
Au-Au ASSEMBLY
24-mer LINKED
48-mer LINKED
S (s)
3
2
1
0.05
0.10
s (nm -1)

Figure 60

Scheme 1



SEQUENCE LISTING

<110> Mirkin, Chad A.
Letsinger, Robert L.
Mucic, Robert C.
Storhoff, James J.
Elghanian, Robert
Taton, Thomas A.

<120> NANOPARTICLES HAVING OLIGONUCLEOTIDES ATTACHED THERETO AND USES THEREFOR

<130> 4149-1-1-1-1

<140> Not Yet Assigned
<141> 2000-06-26

<150> 60/031,809
<151> 1996-07-29

<150> PCT/US97/12783
<151> 1997-07-21

<150> 09/240,755
<151> 1999-01-29

<150> 09/344,667
<151> 1999-06-25

<150> 60/200,161
<151> 2000-04-26

<160> 64

<170> PatentIn Ver. 2.1

<210> 1
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 1
aaacgactct agcgcgtata 20

<210> 2
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 2
atggcaacta tacgcgctag 20

<210> 3
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 3
ccttgagatt tcccte 16

<210> 4
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 4
gagggaaatc tcaagg 16

<210> 5
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 5
aacttgcgct aatggcga 18

<210> 6
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 6
aagttgcgct ttacggctaa tggcga 26

<210> 7
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 7
tctccttccc ttttc 15

<210> 8
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 8
gaaaagggaa ggaga 15

<210> 9
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 9
cttttcccct cctct 15

<210> 10
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 10
aaacgactct agcgcgtata gttgccat 28

<210> 11
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 11
atggcaacta tacgcgctag agtcgttt 28

<210> 12
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 12
cctatcgacc atgct 15

<210> 13
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 13
agcatggtcg ataggaaacg actctagcgc 30

<210> 14
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 14
gcgctagagt cgttt 15

<210> 15
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 15
agcatggtcg ataggatggc aactatacgc 30

<210> 16
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 16
gtcgatagga aacgactcta gcgc 24

<210> 17
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 17
agcatggttg ataggaaacg actctagcgc 30

<210> 18
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 18
agcatgtttg ataggaaacg actctagcgc 30

<210> 19
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 19
tctcaactcg ta 12

<210> 20
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 20
cgcattcagg at 12

<210> 21
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 21
tacgagttga gagagtgccc acat 24

<210> 22
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 22
tacgagttga gaatcctgaa tgcg 24

<210> 23
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 23
tacgagttga gaatcctgaa tgct 24

<210> 24

<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 24
tacgagttga gactcctgaa tgcg 24

<210> 25
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 25
tacgagttga gaatcctgaa tgc 23

<210> 26
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 26
tacgagttga gacatcctga atgcg 25

<210> 27
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 27

tacgagttga gaatcctgaa tgcg 24

<210> 28
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 28
taggacttac gc 12

<210> 29
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 29
tacgagttga gaccgttaag acgaggcaat catgcaatcc tgaatgcg 48

<210> 30
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 30
tgcatgattg cctcgtctta acgg 24

<210> 31
<211> 72
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:random
synthetic sequence

<400> 31
tacgagttga gaccgttaag acgaggcaat catgcatata ttggacgctt tacggacaac 60
atcctgaatg cg 72

<210> 32
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random
synthetic sequence

<400> 32
gttgtccgta aagcgtccaa tatatgcatg attgcctcgt cttaacgg 48

<210> 33
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random
synthetic sequence

<400> 33
tctcaactcg ta 12

<210> 34
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random
synthetic sequence

<400> 34
tacgagttga gaatcctgaa tgcg 24

<210> 35

<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 35
cgcattcagg at 12

<210> 36
<211> 141
<212> DNA
<213> anthrax

<400> 36
ggcggatgag tcagtagtta aggaggctca tagagaagta attaattcgt caacagaggg 60
attattgtta aatattgata aggatataag aaaaatatta tccagggtta tattgtagaa 120
attgaagata ctgaagggct t 141

<210> 37
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 37
taacaataat ccctc 15

<210> 38
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 38
atccttatca atatt 15

<210> 39
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 39
tgagcctcct taactactga ctcatccgcc 30

<210> 40
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 40
tgttgacgaa ttaattactt ctcta 25

<210> 41
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 41
tataaccctg gataatattt ttcttat 27

<210> 42
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 42
aagcccttca gtatcttcaa tttctacaa 29

<210> 43
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 43
tctcaactcg taaaaaaaaa aa 22

<210> 44
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 44
tacgagttga gaatcctgaa tgcg 24

<210> 45
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 45
aaaaaaaaaa cgcattcagg at 22

<210> 46
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 46
tctcaactcg taaaaaaaaa aa 22

<210> 47
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 47
aaaaaaaaaa cgcattcagg at 22

<210> 48
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 48
tacgagttga gaatcctgaa tgcg 24

<210> 49
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 49
ctacttagat ccgagtgccc acat 24

<210> 50
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 50
cgcattcagg at 12

<210> 51
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 51
aaaaaaaaaa aaaaaaaaaa cgcattcagg at 32

<210> 52
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 52
cgcattcagg atwwwwwwww wwwwwwwwww ww 32

<210> 53
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 53
atcctgaatg cg 12

<210> 54
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 54
atcctgaatg cg 12

<210> 55
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 55
aaaaaaaaaa aaaaaaaaaa 20

<210> 56
<211> 27
<212> DNA
<213> Anthrax

<400> 56
ggattattgt taattattga taaggat 27

<210> 57
<211> 12
<212> DNA
<213> Anthrax

<400> 57
taacaatnat cc 12

<210> 58
<211> 15
<212> DNA
<213> Anthrax

<400> 58
atccttatca atatt 15

<210> 59
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 59
tctcaactcg ta 12

<210> 60
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 60
tacgagttga gaatcctgaa tgcg 24

<210> 61
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random synthetic sequence

<400> 61
gcgtaagtcc taacgtacta acggagcaga attgccagag ttgagcat 48

<210> 62
<211> 72
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random
synthetic sequence

<400> 62
gcgtaagtcc tacaacaggc atttcgcagg ttatatacgt actaacggag cagaattgcc 60
agagttgagc at 72

<210> 63
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random
synthetic sequence

<400> 63
tgcatgattg cctcgtctta acgg 24

<210> 64
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:random
synthetic sequence

<400> 64
gttgtccgta aagcgtccaa tatatgcatg attgcctcgt cttaacgg 48